

**REMARKS**

Claims 1, 10, and 12-14 are pending. Claims 2-9 and 11 have been canceled. Claims 13 and 14 are new. The applicants respectfully request reconsideration and allowance of this application in view of the above amendments and the following remarks.

Claims 1, 10 and 12 were rejected under 35 USC 103(a) as being unpatentable over JP-A 02-107682 to Inako *et al.* (hereafter, Inako), US 6627844 to Liu *et al.* (hereafter, Liu) and JP 01125345U to Aoyama. The applicants respectfully request that this rejection be withdrawn for the following reasons.

Liu discloses "metal, polymer, ceramic, semiconductor material, or any other suitable material" as the specified material for laser milling. However, all types metal, polymer, ceramic and semiconductor material are not suitable for laser milling, and it would not have been obvious to one of ordinary skill in the art to have laser beam-machined polyvinyl chloride or polyurethane.

In claim 1, the base material includes a resin film made of polyvinyl chloride or polyurethane. However, it has been generally thought that polyvinyl chloride and polyurethane were not suitable for laser beam machining for forming through-holes, as explained in more detail below.

Published Japanese Patent Application No. H07-276589 describes that if laser beam machining is carried out on polyvinyl chloride, harmful hydrogen chloride is generated. See paragraph 0006. The relevant page of Japanese Patent Application No. H07-276589, an English abstract, and a machine translation of the entire publication are attached.

The melting point of polyvinyl chloride (PVC) is 200-210°C. See paragraph 0011 of published Japanese Patent Application No. H10-258425. The relevant page of Japanese Patent

Application No. H10-258425, an English abstract, and a machine translation of the entire publication are attached.

As for polyurethane, paragraph 0024 of published Japanese Patent Application No. 2001-47719 describes that laser beam machining could not be carried out on polyurethane, because the resin became sticky and the odor during the processing was unacceptable. The relevant page of Japanese Patent Application No. 2001-47719, an English abstract, and a machine translation of the entire publication are attached.

Furthermore, according to paragraph 0084 of published Japanese Patent Application No. 1106-210780, the melting point of polyurethane is 110 °C. The melting point of polyurethane is much lower, for example, than the melting point of polyvinyl chloride. Therefore, it was thought that if laser beam machining was carried out on polyurethane, the polyurethane would melt before the through-holes could be formed. The relevant page of Japanese Patent Application No. 1106-210780, an English abstract, and a machine translation of the entire publication are attached.

Therefore, it would not have been obvious to one of ordinary skill in the art to have combined Inako, Liu and Aoyama as proposed in the office action. That is, it would not have been obvious to have used the laser method of Liu to machine holes in the sheet of Inako, and this rejection should be withdrawn.

Claims 13 and 14 are new. In claim 13, the base material includes a resin film made of polyolefin. However, it has been thought that polyolefin was not suitable for laser beam machining for forming through-holes. According to paragraph 0022 of published Japanese Patent Application No. 2003-27370, the melting point of polyethylene is 130 °C. Polyethylene is a kind of polyolefin. See paragraph 0013. The melting point of polyethylene is much lower, for

example, than the melting point of polyvinyl chloride. Thus, it was thought that if laser beam machining was carried out on polyethylene (polyolefin), the polyethylene (polyolefin) would melt before the through-holes could be formed. Therefore, claim 13 is not rendered obvious by a combination of Inako, Liu and Aoyama.

In claim 14, the base material includes a resin film made of polyester. However, generally, it was thought that polyester was not suitable for forming through holes by laser beam machining, and none of the cited references discloses or suggests forming through holes by laser beam machining in polyester.

In view of the foregoing, the applicants submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions arise, the examiner is invited to contact the undersigned by telephone.

If there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Deposit Account No. 50-1147.

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【特許請求の範囲】

【請求項1】 基材層の一方の面に粘着剤層が積層されてなる表面保護フィルムであって、

該基材は厚みが $60 \sim 200 \mu\text{m}$ のポリオレフィンからなり、

該基材層の少なくとも一方の面の動摩擦係数が $0.7$ 以下のポリオレフィンからなり、

かつ、該基材の引張破断強度は $250 \text{ kg}/\text{cm}^2$ 以上、引張破断時の伸度は $600\%$ 以上、引張伸長時応力の降伏点はないかもしくは降伏点後の応力低下率は降伏点強度の $15\%$ 以下であり、かつ伸長回復率は $70\%$ 以上であることを特徴とする表面保護フィルム。

【請求項2】 基材が基材層と該基材層の一面もしくは両面に設けられた薄層とを有する多層構成の基材からなり、該薄層の動摩擦係数が $0.7$ 以下である請求項1記載の表面保護フィルム。

【請求項3】 薄層のデュロメータ硬度 $D$ が $50$ 以上であり、前記基材層の厚みから薄層の厚みを引いた厚みが前記基材の厚みに対して $70\%$ 以上であり、かつその基材の薄層を除く部分の結晶化度が $60\%$ 以下、密度が $0.880 \sim 0.915 \text{ g}/\text{cm}^3$ である請求項2に記載の表面保護フィルム。

【請求項4】 前記基材の一面もしくは両面に薄層を設け、その薄層が、 $0.5 \sim 50$ 重量%の無機系粒子状物質を含む動摩擦係数 $0.7$ 以下のポリオレフィンからなる請求項2に記載の表面保護フィルム。

【請求項5】 前記基材が、 $0.5 \sim 30$ 重量%の無機系粒子状物質を含むポリオレフィンからなる請求項1に記載の表面保護フィルム。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、ステンレス等の板材の表面保護に用いられる表面保護フィルムに関し、特に $1 \text{ mm}$ 以上の厚い金属板の曲げ加工に使用されるベンダー曲げ加工される板材に適した表面保護フィルムに関する。

【0002】

【従来の技術】従来より、金属板を加工する際に適した表面保護フィルムとしては、軟質ポリ塩化ビニルを基材とし、その裏面に粘着剤層を設けたものが多用されている。また、ポリオレフィンからなる基材においては、主に絞り加工に適した基材の検討が行われており、特開昭53-21239号公報や特公平1-14265号公報等では、特に柔軟性、加工追従性に優れた基材を得ることを目的として、直鎖状低密度ポリエチレン（LLDPE）、すなわちエチレンと $\alpha$ -オレフィンとの共重合体にて基材を形成することが提案されている。

【0003】ところで、曲げ加工される金属板の表面保護フィルムに使用される基材としては、強度の高い基材が好ましいという提案がなされている（日立化成技術論

文集、昭57.10：中尾他）以外、ほとんど検討されておらず、現在では上記のように軟質ポリ塩化ビニル基材を使用した表面保護フィルムが非常に多く使用されてきた。

【0004】

【発明が解決しようとする問題】上記日立化成技術論文集に記載されているように、高強度な基材を用いて得られる表面保護フィルムにおいて、高強度な基材は一般に降伏点を持っており、特に基材の縦横方向でその強度特性に大きな差を有しており強度が高いものほどその傾向が大きくなるため、金属板の曲げ加工時においてフィルムの切れの問題が改善されない。

【0005】上記特開昭53-21239号公報および特公平1-14265号公報においては、比較的低密度のエチレンと $\alpha$ -オレフィンとの共重合体からフィルム基材を形成し、金属板の絞り加工用途での冷間加工追従性、応力緩和性が検討されている。しかし、これらの公報で得られた基材においても、金属板の曲げ加工用途での切れに対してはその効果はみられない。

【0006】上記軟質ポリ塩化ビニルからなる基材を使用し表面保護フィルムは、十年以上前より使用されており、その加工時に比較的に切れにくい強度特性とその基材の汎用性により現在も非常に多く使用されているが、焼却時有害な塩化水素を発生することからその廃棄物処理の問題がある。さらに近年増加しているレーザー加工においても塩素化合物による設備的有害ガス等の発生等がある。また、表面保護フィルムを金属板に貼付けたものを段積み積重ね保管時にポリ塩化ビニル基材の表層と板とが密着して割れれ難くなるという問題もある。すなわち、表面保護フィルムが表面に張り付けられた板材を多数積重ねた状態で保管した際に、その板材の重量により表面保護フィルムの表層が上に位置する板材表面に密着して、板材を取出する時の作業性が低下するのである。

【0007】ポリオレフィンからなるものでは、軟質ポリ塩化ビニル基材と同様に柔軟な基材においては、フィルムを巻き状態で保管する際にブロッキングの問題が発生する。

【0008】

【課題を解決するための手段】そこで本発明者らはポリオレフィンからなる基材（以下、ポリオレフィン系基材ともいう）にて金属板の曲げ加工時に発生する切れ防止に適した表面保護フィルムについて鋭意検討を行った結果、その基材の少なくとも一方の面の動摩擦係数の小さい材料から形成し、引張強度が破断時 $250 \text{ kg}/\text{cm}^2$ 以上、伸度 $600\%$ 以上で且つ明確な降伏点を持たず、その伸長回復率が $70\%$ 以上となる基材2を使用することにより、金属板8の曲げ加工時の保護フィルム1の切れ発生が防止され、しかも基材自身を巻物として保管する時の基材2同士のプロッキングを防止する目的が

## PATENT ABSTRACTS OF JAPAN

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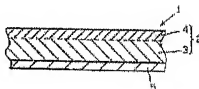
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## (54) SURFACE PROTECTIVE FILM

(57)Abstract:

PURPOSE: To prevent the cutting of a protective film at the time of the bending processing of a metal panel and the mutual blocking of a base material at the time of keeping in a roll form.

CONSTITUTION: A surface protective film 1 has a multilayered base material 2 consisting of a base material layer 3 and the thin layer 4 provided on one surface of the base material layer 3 and the self-adhesive layer 5 laminated to the surface opposite to the thin layer 4 of the base material 2. The base material is composed of a polyolefin layer with a thickness of 80-200  $\mu$ m and the surface layer 4 is composed of polyolefin with the coefficient of dynamic friction of 0.7 or less. The base material 2 is characterized by that tensile breaking strength is 250kg/cm<sup>2</sup> or more, tensile elongation at break is 600% or more, a stress yield point at the time of elongation is not shown or a stress lowering ratio after the yield point is 15% or less of yield point strength and deformation recovery is 70% or more.



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## CLAIMS

[Claim(s)]

[Claim 1]It is a surface protection film in which one field of a base material layer comes to laminate an adhesive layer, This substrate consists of 60-200-micrometer-thick polyolefine, and a dynamic friction coefficient of at least one field of this base material layer consists of 0.7 or less polyolefine, And a surface protection film, wherein a breakdown point of stress does not have [ as for tensile breaking strength of this substrate ] the degree of tensile elongation at break not less than 600% at the time of tensile extension in more than 250 kg/cm<sup>2</sup>, a stress decreasing rate after a breakdown point is 15% or less of yield point strength and an extension recovery factor is not less than 70%.

[Claim 2]The surface protection film according to claim 1 whose dynamic friction coefficient of this thin layer a substrate consists of a substrate of multilayered constitution which has the thin layer provided in the whole surface or both sides of a base material layer and this base material layer, and is 0.7 or less.

[Claim 3]The durometer hardness D of a thin layer is 50 or more, and thickness which lengthened thickness of a thin layer from said base material thickness is not less than 70% to thickness of said substrate, And the surface protection film according to claim 2 whose density a degree of crystallinity of a portion except a thin layer of the substrate is 60% or less, and is 0.880 - 0.915 g/cm<sup>3</sup>.

[Claim 4]The surface protection film according to claim 2 which provides a thin layer in the whole surface or both sides of said substrate and in which the thin layer consists of with a dynamic friction coefficient of 0.7 or less containing 0.5 to 50% of the weight of inorganic system particulate matter polyolefine.

[Claim 5]The surface protection film according to claim 1 in which said substrate consists of polyolefine containing 0.5 to 30% of the weight of inorganic system particulate matter.

[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to a surface protection film suitable for the plate which is especially used for bending of a thick metal plate of 1 mm or more and by which vendor bending is carried out about the surface protection film used for the surface protection of plates, such as stainless steel.

[0002]

[Description of the Prior Art]As a surface protection film which was suitable conventionally when processing a metal plate, soft polyvinyl chloride is used as a substrate and what provided the adhesive layer in the rear-face side is used abundantly. In the substrate which consists of polyolefines, Examination of the substrate which mainly fitted spinning is performed and in JP,S53-21239,A or JP,H1-14265,B. Forming a substrate with a copolymer with straight-chain-shape low density polyethylene (LLDPE), i.e., ethylene, and alpha olefin for the purpose of obtaining the substrate which was especially excellent in pliability and processing flatness nature is proposed.

[0003]By the way, as a substrate used for the surface protection film of the metal plate by which bending is carried out, Except that the proposal that a substrate with high intensity is preferred is made (Hitachi Chemical technical collected papers, Showa 57.10; Nakao etc.), it hardly inquires but very many surface protection films which use a soft-polyvinyl-chloride substrate as mentioned above have been used now.

[0004]

[Problem(s) to be Solved by the Invention]In the surface protection film obtained using a high intensity substrate as indicated to the above-mentioned Hitachi Chemical technical collected papers, Since the high intensity substrate generally has a breakdown point, it has a big difference in the strength property especially in the direction of a substrate in every direction and the tendency becomes large as what has high intensity, the problem of the piece of a film is not solved at the time of bending of a metal plate.

[0005]In above-mentioned JP,S53-21239,A and JP,H1-14265,B, a film base is comparatively formed from the copolymer of the ethylene of low density, and alpha olefin, and the cold work flatness nature in the spinning use of a metal plate and stress relaxation nature are examined. However, in the substrate obtained in these gazettes, the effect is not seen to the piece in the bending use of a metal plate.

[0006]The surface protection film which uses the substrate which consists of the above-mentioned soft polyvinyl chloride is used from ten-year or more before.

Although used very mostly still now from the strength property which cannot go out comparatively easily at the time of the processing, and the flexibility of the substrate, since harmful hydrogen chloride is generated at the time of incineration, there is a problem of the waste treatment.

Also in laser processing which is furthermore increasing in recent years, the equipment target by a chlorine compound has generating of harmful gas etc. There is also a problem of the surface and board of a polyvinyl chloride substrate sticking what stuck the surface protection film on the metal plate at the time of tiering loading storage, and becoming difficult to separate. That is, after the surface protection film had loaded several many plates stuck on the surface, when it is kept, it sticks to the plate surface where the surface of a surface protection film is located upwards with the weight of the plate, and workability when carrying out drawing of the plate falls.

[0007]Like a soft-polyvinyl-chloride substrate, in a flexible substrate, when rolling a film and keeping it in the state, the problem of blocking occurs in what consists of polyolefines.

[0008]

[Means for Solving the Problem]Then, a result in which this invention persons examined wholeheartedly a surface protection film suitable for piece prevention generated with a substrate (henceforth a polyolefin

system substrate) which consists of polyolefines at the time of bending of a metal plate, At least one field of the substrate is formed from material with a small dynamic friction coefficient, In more than  $250 \text{ kg/cm}^2$ , tensile strength with not less than 600% of ductility at the time of a fracture and when it does not have a clear breakdown point but the extension recovery factor uses the substrate 2 used as not less than 70%, It found out that the purpose of piece generating of the protective film 1 at the time of bending of the metal plate 6 being prevented, and preventing blocking of substrate 2 comrades when keeping the substrate itself as a roll moreover was attained.

[0009]The above-mentioned base material thickness has an about 70-130-micrometer preferred thing to a metal plate of about 1-2 mm of board thickness generally used often, although 60-200-micrometer various things are used by metal plate thickness used.

[0010]The tensile breaking strength is more than  $250 \text{ kg/cm}^2$ , and a substrate used by this invention according to claim 1 to 5 does not have a clear breakdown point without a breakdown point at the time of tensile extension. The extension recovery factor has not less than 70% of characteristic without falling not less than 15% from maximum strength before a decrease amount falling, or stress does not specifically decline in the middle of extension at the time of tensile extension. Here, after an extension recovery factor elongates a sample (length  $L_0$ ) 100% with a speed of testing of 200 mm/min, it is opened immediately wide, and it is computed with a following formula by measuring length ( $L_g$ ) after 5-minute progress.

[0011]

$(2L_0 - L_g) / (2L_0 - L_0) \times 100$  [0012]The Reason which needs for a substrate used by this invention according to claim 1 to 5 to have the above-mentioned characteristic is as follows.

[0013]When plastic deformation is not caused when a pressure takes in a shoulder part of a dice at the time of vendor bending, and a pressurized part moves, a piece at the time of bending, and a film bending at the time of advance, and being extended by a ridgeline and perpendicular direction can be prevented by choosing what recovers shape promptly. In order to correspond to such enlargement, not less than 600% of sufficient ductility is needed for a substrate.

[0014]In order to make a predetermined angle and curvature (R) of the bending part inside into a predetermined value for a bend angle by the final part of a bending process, Since it presses down further in the state where it was bent, extended and carried out, generating of a piece of a substrate in that case can be prevented only when tensile strength at the time of pulling a substrate further to said strength property is what is more than  $250 \text{ kg/cm}^2$ .

[0015]Although it winds around a soft-polyvinyl-chloride system surface protection film after providing the adhesive layer, and it unfolds and use of a release agent is performed for the purpose of a sexual improvement, Since the substrate itself changes with a pressure and it does not stick, in processing of the surface by a release agent, it is seldom improved about the blocking nature of a metal plate under high load, and a film.

[0016]Furthermore, as methods other than base material surface processing by a release agent, although addition of a slipping agent, mat-izing of a film surface, embossing-ization, etc. are considered, A binder usable since the adhesion performance is dramatically affected for a surface protection film use about use of an additive agent is restricted, Or use of an additive agent -- there is no usable binder -- is difficult, and even if a production process starts too many also about surface processing and it changes surface shape temporarily in a flexible substrate that it is easy to change to a pressure, under high load, it is difficult [ it ] to improve blocking.

[0017]Then, adhesion of substrates can be prevented by making a dynamic friction coefficient of at least one field of a substrate or less into 0.7 further.

[0018]It can attain by forming a thin layer with construction material harder than a base material layer in this invention according to claim 3, Specifically, high density polyethylene (HDPE), straight-chain-shape low density polyethylene (LLDPE), polypropylene (PP), etc. can be used with the blend with material which forms a simple substance or a base material layer.

[0019]It can attain by adding an inorganic-particulates-like substance in resin which forms a thin layer in this invention according to claim 4.

[0020]It can attain by adding an inorganic-particulates-like substance in flexible substrate formation resin in this invention according to claim 5.

[0021]As for thickness of said thin layer, it is preferred to be referred to as about 5-20 micrometers. In less than 5 micrometers, since the characteristic of a base material layer becomes dominant, if an improvement effect about blocking may not no longer be seen and it exceeds 20 micrometers, influence of



intensity on the whole film will become large too much, and it will become easy to generate a piece at the time of bending.

[0022]A thin layer of a substrate may be provided in which [ of an opposite hand by the side of an adhesive layer or an adhesive layer ] side. When this thin layer is provided in the adhesive layer side, When slide nature of a tape surface can be made low, there is an effect of preventing collapse of cargo piles at the time of adhering loading, etc. and it is conversely provided in an opposite hand by the side of an adhesive layer, It slides, when weight of adherend is large, since the sex is good, there is an advantage of being easy to do cash-drawer work, and according to adherend, it can design freely. Unlike a case where a substrate made from soft polyvinyl chloride is used in the case of which, since there is no creeping property in the substrate itself, adhesion with a metal plate and the surface protection film back cannot get up easily.

[0023]A thin layer can also be provided in both sides of a base material layer for prevention, such as curl of a substrate.

[0024]As polyolefine used for a base material layer, a homopolymer of ethylene, propylene, a copolymer with alpha olefin or propylene, and ethylene is raised with this invention according to claim 1 to 5.

[0025]Although obtained also by raising propylene, 1-butene, 1-pentene, etc., and carrying out copolymerization of the other ingredient to ethylene as mentioned above as the above-mentioned alpha olefin as polyolefine which fills the above-mentioned tensile strength of a substrate, or blending copolymers, It can obtain by what is called the reactor blending method that polymerizes ethylene and a propylene monomer under polypropylene existence preferably. Thereby, a polymerization becomes possible at a very free rate compared with a method which uses a catalyst of the conventional Ziegler type about the amount of alpha olefins in ethylene, the amount of ethylene in propylene, etc.

[0026]EPR, VLLDPE, and Himont which are produced by Mitsui Petrochemical Industries, Ltd. and Idemitsu Petrochemical industry etc. which are the copolymers of ethylene and alpha olefin as a desirable material, Super polyethylene \*\* etc. which use a metallocene catalyst currently made as an experiment by exons, such as KYATAROI, PER, etc. which are the ethylene propylene rubber currently produced in Tokuyama Soda Co., Ltd., etc. are mentioned.

[0027]About a reactor blend, it is by well-known from the former, for example, is indicated to ", JP,H3-205439A, etc. after \*\* polymer journal (Polymer Journal), the 17th volume, No. 1, and 37 page.

[0028]When it is considered as a substrate which has the above strength properties in polyolefine used for a base material layer by this invention according to claim 1 to 5, as for the degree of crystallinity, below density  $0.93 \text{ g/cm}^3$  usually becomes 60% or less.

[0029]In order that this invention according to claim 2 may improve blocking with film state, Provide a thin layer in a substrate as a means for making a dynamic friction coefficient or less into 0.7, and in this invention according to claim 2. Hardness of material for which a thin layer is formed is 50 or more in the durometer D, and a degree of crystallinity of material which forms the above-mentioned base material layer considers it as 50% or less by thickness of the above-mentioned base material layer being not less than 70% to thickness of said substrate, and density considers it as  $0.880 - 0.915 \text{ g/cm}^3$ .

[0030]A dynamic friction coefficient as used in the field of this invention ground 50 \*\*\*\*s of film surfaces by a pressure of  $500\text{g}/(50 \text{ mm} \times 25 \text{ mm})$  with waterproof abrasive paper of No.1000, and performed measurement after washing. Since a difference was hardly regarded as a value measured only with a substrate when an adhesive layer was laminated by substrate, tensile strength measured using a surface protection film including an adhesive layer, and was converted only by thickness of a substrate.

[0031]In this invention according to claim 4 to 5, it is preferred to reduce a coefficient of friction of the surface of a substrate by blending inorganic system particulate matter, such as calcium carbonate, titanium oxide, silica, diatomaceous earth, kaolin, and clay, with whole resin or a substrate which forms a thin layer.

[0032]This invention according to claim 4 holds a dynamic friction coefficient of this layer or less to 0.7 by making said thin layer contain 0.5 to 50% of the weight of inorganic system particulate matter. It is not limited for material which forms a thin layer at all (it may be the same as that of a base material layer, and a hard material is also available).

[0033]This invention according to claim 5 holds a dynamic friction coefficient of a substrate layer part or less to 0.7 by making 0.5 to 30% of the weight of inorganic system particulate matter contain in said flexible substrate.

[0034]As particle diameter of the above-mentioned inorganic system particulate matter, a thing of about tens of micrometers or less has preferred mean particle diameter, and since it becomes being a thing over 100 micrometers with a cause of a fish eye by a secondary aggregation, it is not desirable.

[0035]When an addition to said whole thin layer or a substrate of the above-mentioned inorganic system

particulate matter is less than 0.5 % of the weight, a value in which a dynamic friction coefficient exceeds 0.7 depending on a kind of polyolefin resin to be used is taken, and blocking of films occurs. When making only a thin layer of an opposite field in which an adhesive layer of a substrate is provided contain inorganic system particulate matter, high concentration can be made to contain to 50 % of the weight. If it exceeds 50 % of the weight, since it will become easy to generate a fish eye by an aggregate of inorganic system particulate matter at the time of substrate membrane formation, it is not desirable.

[0036]If an addition to said thin layer and the whole substrate exceeds 30 % of the weight, since intensity of the whole substrate will fall, and an effect as used in the field of this invention to a piece will be lost and it will become easy to generate a fish eye by an aggregate of inorganic system particulate matter at the time of substrate membrane formation, it is not desirable.

[0037]If a binder used for a surface protection film of this invention is also satisfying a function as a surface protection film, anythings can be used, but especially rubber pressure sensitive adhesive, acrylic pressure sensitive adhesive, etc. are used preferably. The adhesive layer can form a binder also by co-extrusion also by coating. A certain thing of that breaking strength as well as [ an adhesive layer / this adhesive layer is preferred and ] a substrate is preferred enough.

[0038]Thus, prevention from blocking at the time of using a substrate as a roll can be attained by making a dynamic friction coefficient of at least one field of a substrate of a surface protection film of this invention or less into 0.7. Since a surface protection film of this invention becomes a very [ in intensity ] high substrate design, the usual surface-protection function has the performance more than surface protection film [ which uses substrates generally used, such as polyvinyl chloride and polyethylene, ] equivalent.

[0039]

[Function]By forming the substrate used for a surface protection film with given thickness Mino polyolefine, there is also no problem of generating of harmful gas at the time of incineration, and the piece-proof nature at the time of sufficient bending can be given. It can be made hard to occur in blocking in the rolling-up state of only a substrate by using the substrate which shall consist of with a dynamic friction coefficient of 0.7 or less of at least one field of this substrate polyolefine, and has the physical properties in a prescribed range.

[0040]

[Example]

(Working example 1) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is high density polyethylene considering [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] as 90 micrometers and a thin layer. [ "high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F" ] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 10 micrometers, and the substrate was obtained.

[0041]Next, corona discharge treatment was performed to the above-mentioned base material layer side, and also it is a binder. Spreading desiccation of [Soken Chemical & Engineering trade name "AG105"] was carried out so that after-desiccation adhesive layer thickness might be set to 10 micrometers, and the surface protection film was obtained.

[0042](Working example 2) It is high density polyethylene considering the polyolefine (Himont trade name "KS-051P") which is a copolymer of ethylene and propylene as a base material layer as 90 micrometers and a thin layer. [ "high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F" ] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0043]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0044](Working example 3) It is straight-chain-shape ultra low density polyethylene as a base material layer. [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] It is high density polyethylene considering what mixed the polyolefine (Himont trade name "KS-051P") which is a copolymer of ethylene and propylene by 1:1 as 90 micrometers and a thin layer. [Mitsui Petrochemical Industries, Ltd. make trade name "high ZEKKUSU3300F" ] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0045]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0046](Working example 4) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is high density polyethylene to straight-chain-shape ultra low density polyethylene (ULTZEX 1020L) considering [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] as 90 micrometers and a thin layer. What mixed [ "high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F" ]

by 1:1 was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0047]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0048](Working example 5) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is polypropylene considering [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] as 90 micrometers and a thin layer. [Mitsui Petrochemical Industries, Ltd. make "highball F650"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0049]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0050](Working example 6) Adhesion processing was performed to the thin layer side of the substrate produced by making it be the same as that of working example 1 like working example 1, and the surface protection film was obtained.

[0051](Working example 7) It is straight-chain-shape ultra low density polyethylene as a substrate. Calcium carbonate was added 5% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"], membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0052]Adhesion processing was carried out to the whole surface of the obtained substrate like working example 1, and the surface protection film was obtained.

(Working example 8) Calcium carbonate was added 5% of the weight to the polyolefine (Himont trade name "KS-051P") which is a copolymer of ethylene and propylene as a substrate, membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0053]Adhesion processing was carried out to the whole surface of the obtained substrate like working example 1, and the surface protection film was obtained.

[0054](Working example 9) It is straight-chain-shape ultra low density polyethylene as a substrate. [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] Calcium carbonate was added 5% of the weight to what mixed the polyolefine (Himont trade name "KS-051P") which is a copolymer of ethylene and propylene by 1:1, membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0055]Adhesion processing was carried out to the whole surface of the obtained substrate like working example 1, and the surface protection film was obtained.

[0056](Working example 10) It is straight-chain-shape ultra low density polyethylene as a substrate. Titanium oxide was added 5% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"], membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0057]Adhesion processing was carried out to the whole surface of the obtained substrate like working example 1, and the surface protection film was obtained.

[0058](Working example 11) It is straight-chain-shape ultra low density polyethylene as a substrate. Diatomaceous earth was added 5% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"], membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0059]Adhesion processing was carried out to the whole surface of the obtained substrate like working example 1, and the surface protection film was obtained.

[0060](Working example 12) It is straight-chain-shape ultra low density polyethylene as a substrate. What added calcium carbonate for [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] 10% of the weight in 90 micrometers and the polyethylene was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0061]Adhesion processing was carried out to the whole surface of the base material layer of the obtained substrate like working example 1, and the surface protection film was obtained.

[0062](Working example 13) It is straight-chain-shape ultra low density polyethylene as a substrate. They are 90 micrometers and high density polyethylene about [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"]. What added calcium carbonate 1% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "high ZEKU3300S"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was

obtained.

[0063]Adhesion processing was carried out to the whole surface of the base material layer of the obtained substrate like working example 1, and the surface protection film was obtained.

[0064](Comparative example 1) Straight-chain-shape ultra low density polyethylene[Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] was formed with the tubular film process so that it might be set to 100 micrometers, and the substrate was obtained.

[0065]Next, the adhesive layer was provided in one field of the substrate like working example 1, and the surface protection film was obtained.

[0066](Comparative example 2) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is high density polyethylene considering [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] as 35 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 5 micrometers and the total thickness of 40 micrometers, and the substrate was obtained.

[0067]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0068](Comparative example 3) It is low density polyethylene as a base material layer. It is high density polyethylene considering [Mitsui Petrochemical Industries, Ltd. make trade name "Milan 12"] as 90 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0069]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0070](Comparative example 4) It is straight-chain-shape low density polyethylene as a base material layer. It is high density polyethylene considering [trade name ULTZEX 3520by Mitsui Petrochemical Industries, Ltd. L"] as 90 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0071]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0072](Comparative example 5) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is high density polyethylene considering [Mitsui Petrochemical Industries, Ltd. make goods "ULTZEX 1020L"] as 50 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 50 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0073]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0074](Comparative example 6) It is straight-chain-shape ultra low density polyethylene as a base material layer. It is high density polyethylene considering [Nippon Unicar trade name "DFDA1137"] as 90 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0075]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0076](Comparative example 7) It is polybutene as a base material layer. It is high density polyethylene considering [trade name "BYURONB027by Mitsui Petrochemical Industries, Ltd."] as 90 micrometers and a thin layer. ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0077]Next, the surface protection film was obtained like working example 1 except having used the substrate.

[0078](Comparative example 8) Straight-chain-shape ultra low density polyethylene [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] High density polyethyleneMembranes were formed with the tubular film process and the substrate was obtained so that ["high ZEKKUSU3300by Mitsui Petrochemical Industries, Ltd. F"] might be mixed by 8:2 and it might be set to 100 micrometers in thickness.

[0079]Next, the adhesive layer was provided in one field of the substrate like working example 1, and the surface protection film was obtained.

[0080](Comparative example 9) Straight-chain-shape ultra low density polyethylene Calcium carbonate was added 0.3% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"], membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0081]Next, the adhesive layer was provided in one field of the substrate like working example 1, and the surface protection film was obtained.

[0082](Comparative example 10) Straight-chain-shape ultra low density polyethylene Calcium carbonate was added 50% of the weight to [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"], membranes were formed with the tubular film process and the substrate was obtained so that it might be set to 100 micrometers in thickness.

[0083]Next, the adhesive layer was provided in one field of the substrate like working example 1, and the surface protection film was obtained.

[0084](Comparative example 11) Straight-chain-shape ultra low density polyethylene What added calcium carbonate for [Mitsui Petrochemical Industries, Ltd. make trade name "ULTZEX 1020L"] 70% of the weight in 90 micrometers and the polyethylene was formed by tubular film process co-extrusion so that it might become 10 micrometers and the total thickness of 100 micrometers, and the substrate was obtained.

[0085]Next, the adhesive layer was provided in the base material layer of the substrate like working example 1, and the surface protection film was obtained.

[0086](Reference example 1) The soft-polyvinyl-chloride base material surface protective film by NITTO DENKO CORP. (trade name "SPV-201") was used.

[0087](Reference example 2) The low-density-polyethylene base material surface protective film by Hitachi Chemical Co., Ltd. (trade name "P-640") was used.

[0088]Next, the decreasing rate of the dynamic friction coefficient of the substrate obtained by each above-mentioned working example and a comparative example and the surface protection film of a reference example, tensile breaking strength, and the tensile strength at the time of extension, the degree of tensile breaking extension, and the degree of crystallinity were measured in accordance with the following valuation methods, respectively.

[0089]<A valuation method> \*\* tensile strength, ductility: The 10-mm-wide specimen was perpendicularly produced to the membrane formation direction of a film, and the decreasing rate of the intensity at the time of tension, and the intensity and the ductility at the time of a fracture were measured by speed-of-testing 200 mm/min at 40 mm between 40 mm and a zipper during the mark.

[0090]\*\* Extension recovery factor : the gauge length 5 minutes after pulling 100 mm and releasing immediately after by speed-of-testing 200 mm/min at 100 mm between 100 mm and a zipper during a mark about the specimen of the \*\* said appearance was measured, and the recovery factor was computed with the following formula.

[0091]Extension recovery-factor (%) =  $(2L_0 - L_g) / (2L_0 - L_0) \times 100$  \*\* dynamic friction coefficient : grind 50 \*\*\*s of the surfaces of a film by the pressure of 500g/(50 mm x 25 mm) with the waterproof abrasive paper of No.1000, and with water what was washed and dried, It stuck on the scraper (63 mm x 63 mm), and the dynamic friction coefficient in the state where film surfaces were doubled was measured. Other conditions were based on JIS K7125.

[0092]\*\* Go out and : protective film is stuck on 1.5 mm in thickness, and a 2.0-mm stainless plate (SUS304HL), respectively, The 12-mm-wide die was used with the vendor bending machine, it was processed by having bent so that a result might be 90 degrees in ram speed 8 mm/min, the piece of the protective film after processing was observed visually, and it expressed as the following signs.

[0093]O: piece-generating-less \*\*: -- it went out in part, and it is, and went out all over x.; and the BUROKINGU; film surface over a generating \*\* blocking; metal plate was put on the stainless plate (SUS304HL), and at 40 \*\*, it lengthened after the application-of-pressure storage for one month on condition of 10 kg/cm<sup>2</sup>, and removed, and blocking was evaluated.

[0094]Blocking to a film; the surface and the back of the film of two sheets were piled up, and at 40 \*\*, it lengthened after one-month application-of-pressure storage on condition of 1 kg/cm<sup>2</sup>, and removed, blocking was evaluated, and it expressed as the following signs.

[0095]O: the board with a thickness [ the raw material of the thin layer / which requires power for a while for \*\*: lengthening and removing / portion of the \*\* hardness; protective film which x: lengthens and removes and requires tense this power which can exfoliate easily to ] of 2 mm was created, and it measured by JIS K7215 D hardness about this board.

[0096]\*\* Degree of crystallinity : it is based on heat-of-fusion measurement.

[0097]The above result is shown in Tables 1 and 2.

[0098]

[Table 1]

| 項目<br>単位 | 摩擦<br>係数 | 引張破<br>断強度<br>kg/cm <sup>2</sup> | 強度<br>低下率<br>% | 引張破<br>断強度<br>% | 変形<br>回復率<br>% | ブロッキング<br>金属板<br>フィルム | 薄層の<br>厚さ<br>D | 切<br>板<br>1.5mm | れ<br>厚<br>2.0mm | 密<br>度<br>g/cm <sup>3</sup> | 結晶<br>化度 |    |
|----------|----------|----------------------------------|----------------|-----------------|----------------|-----------------------|----------------|-----------------|-----------------|-----------------------------|----------|----|
| 実施例 1    | 0.51     | 336                              | 4              | 1024            | 76             | ○                     | ○              | 61              | ○               | ○                           | 0.914    | 47 |
| 実施例 2    | 0.57     | 272                              | 0              | 1064            | 81             | ○                     | ○              | 61              | ○               | ○                           | 0.896    | 31 |
| 実施例 3    | 0.53     | 372                              | 4              | 1063            | 78             | ○                     | ○              | 61              | ○               | ○                           | 0.905    | 38 |
| 実施例 4    | 0.40     | 356                              | 6              | 1082            | 81             | ○                     | ○              | 55              | ○               | ○                           | 0.912    | 46 |
| 実施例 5    | 0.41     | 382                              | 6              | 1011            | 80             | ○                     | ○              | 67              | ○               | ○                           | 0.909    | 46 |
| 実施例 6    | 0.51     | 336                              | 4              | 1024            | 76             | ○                     | ○              | 61              | ○               | ○                           | 0.914    | 47 |
| 比較例 1    | 1.10     | 421                              | 3              | 1124            | 84             | ○                     | ×              | 43              | ○               | ○                           | 0.910    | 44 |
| 比較例 2    | 0.32     | 392                              | 6              | 994             | 78             | ○                     | ○              | 61              | ×               | ×                           | 0.914    | 47 |
| 比較例 3    | 0.36     | 226                              | 18             | 1225            | 62             | ○                     | ○              | 61              | ×               | ×                           | 0.925    | 52 |
| 比較例 4    | 0.33     | 332                              | 32             | 1099            | 55             | ○                     | ○              | 61              | ×               | ×                           | 0.937    | 61 |
| 比較例 5    | 0.35     | 323                              | 28             | 872             | 53             | ○                     | ○              | 61              | △               | ×                           | 0.932    | 58 |
| 比較例 6    | 0.42     | 232                              | 14             | 994             | 81             | ○                     | ○              | 61              | △               | ×                           | 0.919    | 43 |
| 比較例 7    | 0.44     | 295                              | 2              | 488             | 67             | ○                     | ○              | 61              | △               | ×                           | 0.905    | 45 |
| 比較例 8    | 0.82     | 245                              | 17             | 1062            | 80             | ○                     | ×              | 52              | ×               | ×                           | 0.918    | 49 |

[0099]

[Table 2]

| 項目<br>単位 | 摩擦<br>係数 | 引張破<br>断強度<br>kg/cm <sup>2</sup> | 強度<br>低下率<br>% | 引張破<br>断強度<br>% | 伸長<br>回復率<br>% | ブロッキング<br>金属板<br>フィルム | 切板<br>1.5mm | れ<br>厚<br>2.0mm | フィルム<br>外観 |
|----------|----------|----------------------------------|----------------|-----------------|----------------|-----------------------|-------------|-----------------|------------|
| 実施例 7    | 0.63     | 342                              | 8              | 1024            | 80             | ○                     | △           | ○               | ○          |
| 実施例 8    | 0.65     | 272                              | 0              | 1094            | 85             | ○                     | △           | ○               | ○          |
| 実施例 9    | 0.64     | 372                              | 3              | 1063            | 82             | ○                     | △           | ○               | ○          |
| 実施例 10   | 0.63     | 343                              | 3              | 1022            | 80             | ○                     | △           | ○               | ○          |
| 実施例 11   | 0.62     | 342                              | 3              | 1020            | 80             | ○                     | △           | ○               | ○          |
| 実施例 12   | 0.58     | 325                              | 3              | 1011            | 80             | ○                     | ○           | ○               | ○          |
| 実施例 13   | 0.50     | 336                              | 4              | 1024            | 79             | ○                     | ○           | ○               | ○          |
| 比較例 9    | 0.98     | 404                              | 3              | 1094            | 82             | ○                     | ×           | ○               | ○          |
| 比較例 10   | 0.52     | 232                              | 4              | 958             | 78             | ○                     | ○           | △               | ×          |
| 比較例 11   | 0.46     | 287                              | 4              | 898             | 80             | ○                     | ○           | ○               | ×          |
| 参考例 1    | 0.56     | 326                              | 0              | 365             | 70             | ×                     | —           | △               | ×          |
| 参考例 2    | 0.31     | 284                              | 22             | 898             | 65             | ○                     | —           | △               | ×          |

[0100]The result of Tables 1 and 2 shows the following things.

[0101]Like the comparative example 1, when a thin layer is formed with material with a high dynamic friction coefficient, blocking occurs.

[0102]Like the comparative example 2, when the thickness of a substrate is thin, the intensity of a film is low and it is generated by the piece.

[0103]Like the comparative examples 3 and 6, when the breaking strength of a substrate is low, it is generated by the piece of a film.

[0104]Like the comparative examples 4 and 5, when a substrate is formed with a clear material of a breakdown point, it is generated by the piece of a film.

[0105] Like the comparative example 7, when the ductility of a substrate is low, it is generated by the piece of a film.

[0106] Like the comparative example 8, in not considering it as the multilayered constitution of a surface and a base material layer, the blocking due to the fall of the breaking strength of a film go out and according to dynamic friction coefficient quantity occurs.

[0107] Like the comparative example 9, it is set to coefficient-of-friction  $>0.7$ , and film blocking occurs.

[0108] Like the comparative example 10, by fault addition of inorganic system particulate matter, intensity falls and it is generated by the piece. Appearance also gets worse by a fish eye.

[0109] Like the comparative example 11, appearance also gets worse by a fish eye.

[0110]

[Effect of the Invention] According to this invention, there are the following effects.

[0111] (1) Since a polyvinyl chloride system substrate is not used, there is no generating of harmful gas at the time of incineration processing of waste.

[0112] (2) As compared with the conventional olefin substrate, it has sufficient piece-proof performance at the time of processing of a metal plate with high tensile strength.

[0113] (3) Unlike a polyvinyl chloride system substrate, since the temperature dependence of the substrate characteristic is small, necessities, such as change of the substrate presentation by the summer and winter, are lost.

[0114] (4) Unlike a polyvinyl chloride system substrate, since the temperature dependence of the substrate characteristic is small, it is hard to generate the piece at the time of metal plate processing by change of the ambient temperature of a processing operation place.

[0115] (5) When the higher polyolefin system substrate of breaking strength is used, piece-proof nature equivalent to a polyvinyl chloride system substrate can be revealed with thinner base material thickness.

[0116] (6) Since specific gravity is small as compared with the film which uses a polyvinyl chloride system substrate and weight is reduced dramatically, the handling of double-width-izing, long-picture-izing, etc. becomes easy.

[0117] (7) Even when a film begins to wind and a portion has restrictions of weight, since the specific gravity of a substrate is small, also by the same weight, it can wind more, what has long length can be used, and workability, such as film exchange in an attachment workplace, can be improved.

[0118]

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[Translation done.]

【特許請求の範囲】

【請求項1】 比重分離装置の比重液として尿素を所定量含有する水溶液を用い、前記比重分離装置に腐プラスチックを投入し、前記比重液をポリエチレンおよびポリプロピレンの融点以上に加熱して前記腐プラスチックに含まれるポリエチレンおよびポリプロピレンを溶融し比重分離によって前記腐プラスチックからポリエチレンおよびポリプロピレンを分離するとともに分離した溶融状態の前記ポリエチレンおよびポリプロピレンを冷却して所定の粒徑を有する粒状物に成形することを特徴とする腐プラスチックからポリエチレンおよびポリプロピレンの粒状物を造粒する方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、廃棄物から分離したプラスチック系廃棄物（以下、「腐プラスチック」という）から塩素含有プラスチック（PVC（ポリ塩化ビニル）およびPVC（ポリ塩化ビニル）等）とPE（ポリエチレン）およびPP（ポリプロピレン）とを分離し、分離したPEおよびPPを鉄源の還元剤としてマテリアルサイクリルに造粒するための方法に関するものである。

【0002】

【従来の技術】プラスチックは、多種類のものが開発され、年々その使用量が増加している。これらの合成プラスチックの中で自然界において生分解されるものは殆ど無いため、使用済みの腐プラスチックは、回収利用される場合を除いて、大部分が他の廃棄物と一緒に埋立て処分または焼却処分されている。廃棄物中の腐プラスチックを埋立て処分するには、容積率が大きいため広大な土地を必要とする問題がある。一方、腐プラスチックを焼却処理すると、塩素含有プラスチックが熱分解して有毒な塩化水素ガスを排出し、また、腐プラスチックを鉄源の還元剤としてマテリアルサイクリルに供する場合に、プラスチック中の塩素含有プラスチックの許容含有率は1%以下に低減させる必要があり、腐プラスチックから塩素含有プラスチックを分離除去する必要がある。

【0003】塩素含有プラスチックの分離方法には、シンクフオート、液体サイクロン、湿式凝型分離装置および造粒分離装置などによる湿式比重分離方法と、近赤外線やX線の吸収差を利用して塩素含有プラスチックを識別し、エア等ではじき飛ばすなどして分離する乾式分離方法とが知られている。

【0004】しかしながら、湿式比重分離方法では比重差がないPET（ポリエチレンテレフタレート）と、PVCおよびPVDCとを分離することは不可能である。また、PS（ポリスチレン）を浮上分離させるためには比重1.2程度の重液を使用しなくてはならない。

【0005】一方、乾式分離では、フィルム系プラステ

ックは整列が困難であり、処理量が低いといった問題がある。

【0006】

【発明が解決しようとする課題】腐プラスチックを流研原料として供するためには6mm以下の粒徑を有する粒状物に成形する必要がある。特に、フィルム系のプラスチック、即ち、フィルム、シート、袋およびトレー等を粒状物に成形するためには、溶融および造粒工程が必要である。

【0007】また、比重分離装置によってプラスチックの比重分離を行うためにはプラスチックの溶融が必要であり、溶融をするためにプラスチックの融点以上の高熱の比重液が必要である。しかしながら、例えば、180℃の比重液を水によりつくりだすためには、約10kg/cm<sup>2</sup>の圧力が必要であるといった問題がある。そして、それには、加圧装置の設備が必要である。

【0008】従って、この発明の目的は、比重液を用いる比重分離装置を使用し、PEおよびPPと塩素含有プラスチックとを比重分離し、PEおよびPPを鉄源の還元剤としてマテリアルサイクリルに造粒する工程において、比重液を所定の高圧で加圧すること無しにプラスチックの溶融可能な所定の高温とし腐プラスチックからPEおよびPPを分離しそして効率良く造粒することができる方法を提供することにある。

【0009】

【課題を解決するための手段】請求項1記載の発明は、比重分離装置の比重液として尿素を所定量含有する水溶液を用い、前記比重分離装置に腐プラスチックを投入し、前記比重液をポリエチレンおよびポリプロピレンの融点以上に加熱して前記腐プラスチックに含まれるポリエチレンおよびポリプロピレンを溶融し比重分離によって前記腐プラスチックからポリエチレンおよびポリプロピレンを分離するとともに分離した溶融状態の前記ポリエチレンおよびポリプロピレンを冷却して所定の粒徑を有する粒状物に成形することに特徴を有するものである。

【0010】上記課題は、比重分離装置の比重液として尿素を添加した水溶液を使用することによって解決される。比重分離装置の比重液として尿素を含有する水溶液を用いることにより、加圧装置による加圧工程無しに所定の高温の比重液が得られる。

【0011】PEは、比重が約0.9、PPは、比重が約0.95、塩素含有プラスチック（PVC、PVC、PEは、比重が約1.4である。また、PEは、融点が108～135℃、PPは、融点が168～170℃、塩素含有プラスチック（PVC、PVDC）は、融点が200～210℃である。

【0012】尿素は、分子量が60.06であり、比重が1.32であり、例えば、水1に対して10の尿素を加えた水溶液を比重液として使用すれば、比重が約1.



## PATENT ABSTRACTS OF JAPAN

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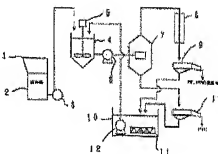
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## (54) METHOD FOR GRANULATING GRANULAR MATTER OF POLYETHYLENE AND POLYPROPYLENE FROM WASTE PLASTIC

## (57)Abstract:

PROBLEM TO BE SOLVED: To granulate granular matter of PE and PP by separating chlorine-containing plastic and PE and PP from waste plastic.

SOLUTION: A film-like plastic is charged in a charging hopper 1 to be crushed into a particle size of 50 mm or less by a crusher 2 and the crushed plastic is transferred to a washing and mixing tank 4 by a blower 3. The crushed plastic is stirred by a stirrer 5 within the washing and mixing tank and, during this period, PE and PP are heated to melting points thereof or higher by a specific gravity soln. composed of a urea aq. soln. (urea:water = 10:1) heated to 190° C to be melted to become liquid droplet matter. The liquid droplet matter of PE and PP mixed by the stirrer 5 and other chlorine-containing plastic (PVC) pieces are transferred to a separation tank 7 by a pump 6 and the liquid droplet matter of PE and PP low in specific gravity is separated from the chlorine-containing plastic high in specific gravity within the separation tank 7 to rise and cooled to below the melting point thereof in a cooling pipe 8 to be molded and granulated into granular matter with a particle size of 6mm or less. The granular matter is separated from the specific gravity soln. by a vibration screen 9. The chlorine-containing plastic pieces separated from PP and PE are discharged from the lower part of the separation tank 7.



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CLAIMS

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[Claim(s)]

[Claim 1] A waste plastic is fed into said gravity separation apparatus using solution which carries out specified quantity content of the urea as specific gravity liquid of a gravity separation apparatus. Fuse polyethylene and polypropylene which heat said specific gravity liquid more than the melting point of polyethylene and polypropylene, and are contained in said waste plastic, and according to specific gravity separation. While separating polyethylene and polypropylene from said waste plastic. How to corn granular material of polyethylene and polypropylene from a waste plastic fabricating to granular material which cools said polyethylene and polypropylene of a separated molten state, and has predetermined particle diameter.

[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]From the plastic system waste (henceforth a "waste plastic") which this invention separated from waste to a chlorine content plastic [PVC (polyvinyl chloride), PVDC (polyvinylidene chloride), etc.] It is related with the method for separating PE (polyethylene) and PP (polypropylene) and corning PE and PP which were separated to the granular material which fitted material recycle as a reducing agent of an iron source.

[0002]

[Description of the Prior Art]The thing of various sorts is developed and the amount used is increasing the plastic every year. since most things by which biodegradation is carried out in a nature in such synthetic plastics cannot be found, a used waste plastic removes the case where recovery use is carried out -- the waste of others [ most ] -- together -- land reclamation -- or incineration disposal is carried out. In order to use the waste plastic in waste for land reclamation, since the floor area ratio is large, there is a problem which needs vast land. On the other hand, if incineration processing of the waste plastic is carried out, a chlorine content plastic will carry out a pyrolysis and will discharge poisonous hydrogen chloride gas. To present material recycle with a waste plastic as a reducing agent of an iron source, it is necessary to reduce the allowable content of the chlorine content plastic in a plastic to 1% or less, and to separate and remove a chlorine content plastic from a waste plastic.

[0003]A wet specific gravity separation method according in the separation method of a chlorine content plastic to sink float, a liquid cyclone, a wet vertical mold decollator, a centrifugal separator, etc., A chlorine content plastic is identified using the absorption difference of a near infrared ray or X-rays, and the dry type separating method which is flown soon and separated is known for air.

[0004]However, it is impossible to separate PET (polyethylene terephthalate) without specific gravity difference, and PVC and PVDC in a wet specific gravity separation method. In order to carry out floatation of the PS (polystyrene), with a specific gravity of about 1.2 heavy liquid must be used.

[0005]On the other hand, in dry type separation, there is a problem that a film system plastic is difficult to align and a throughput is low.

[0006]

[Problem(s) to be Solved by the Invention]In order to offer a waste plastic as a blast furnace material, it is necessary to fabricate to the granular material which has the particle diameter of 6 mm or less. In order to fabricate a plastic, i.e., the film, a sheet, a bag, a tray, etc. of a film system to granular material especially, melting and a granulation stage are required.

[0007]In order for a gravity separation apparatus to perform specific gravity separation of a plastic, melting of a plastic is required, and in order to carry out melting, the hot specific gravity liquid more than the melting point of a plastic is required. However, for example, in order to make 180 \*\* specific gravity liquid with water, there is a problem that the pressure of about 10 kg/cm<sup>2</sup> is required. And equipment of a pressurizer is required for it.

[0008]Therefore, the purpose of this invention uses the gravity separation apparatus which uses specific gravity liquid. In the process of carrying out specific gravity separation of PE and PP, and the chlorine content plastic, and corning PE and PP to the granular material which fitted material recycle as a reducing agent of an iron source, Without pressurizing specific gravity liquid with predetermined high voltage, it is considered as the predetermined elevated temperature which can fuse a plastic, PE and PP are separated from a waste plastic, and it is in providing the method of corning efficiently.

[0009]

[Means for Solving the Problem]The invention according to claim 1 uses solution which carries out specified quantity content of the urea as specific gravity liquid of a gravity separation apparatus. A waste plastic is fed into said gravity separation apparatus. Fuse polyethylene and polypropylene which heat said specific gravity liquid more than the melting point of polyethylene and polypropylene, and are contained in said waste plastic, and according to specific gravity separation. It has the feature to fabricate to granular material which cools said polyethylene and polypropylene of a molten state separated while separating polyethylene and polypropylene from said waste plastic, and has predetermined particle diameter.

[0010]An aforementioned problem is solved by using solution which added urea as specific gravity liquid of a gravity separation apparatus. Hot predetermined specific gravity liquid is obtained without a pressurizing process by a pressurizer by using solution containing urea as specific gravity liquid of a gravity separation apparatus.

[0011]In specific gravity, as for about 0.9 and PP, specific gravity is [ PE / specific gravity of about 0.95 and a chlorine content plastic (PVC, PVDC) ] about 1.4. A chlorine content plastic (PVC, PVDC) is 168-170 \*\* in the melting point, and, as for 108-135 \*\* and PP, is [ PE / the melting point ] 200-210 \*\* in the melting point.

[0012]A molecular weight is 60.06, specific gravity is 1.32, for example, specific gravity is set to about 1.3 and urea can prepare specific gravity liquid whose boiling point is about 190 \*\*, if solution which added urea of 10 to the water 1 is used as specific gravity liquid.

[0013]In a gravity separation apparatus using specific gravity liquid which consists of solution containing urea, by using hot specific gravity liquid from the melting point, PE and PP which are contained in a waste plastic fuse, and serve as a granular drop in specific gravity liquid. By cooling this at the time of discharge, the shaping granulation of PE and the PP is carried out, and they are collected as granular material. And PE and PP are separated with a chlorine content plastic with large specific gravity by specific gravity separation by specific gravity difference.

[0014]

[Embodiment of the Invention]Next, this embodiment of the invention is described. Drawing 1 is process drawing showing the equipment configuration concerning this embodiment of the invention. As shown in drawing 1, this embodiment is the method of dividing into a film system plastic and a bottle system plastic further the waste plastic separated from domestic wastes by a predetermined method, and processing the separated film system plastic.

[0015]The film system plastic separated from domestic wastes is supplied to the charging hopper 1, and is crushed by 50 mm or less by the crusher 2. With subsequently, the specific gravity liquid which consists of urea solution (urea: water =10:1) simultaneously heated by 190 \*\* while the blower 3 washes, it is transported to the mixing chamber 4 and it stirs with the agitator 5 within washing and the mixing chamber 4. PE (polyethylene) and PP (polypropylene) are heated more than the melting point, fuse, and become a drop. The piece of a plastic (chlorine content plastic) of the drop thing of above PE and PP and others is transported to the separation tub 7 with the pump 6, within the separation tub 7, according to specific gravity difference, it separates from a high-density chlorine content plastic (PVC and PVDC), and the drop thing of PE and PP of low specific gravity goes up. It is cooled within the condenser tube 8 at less than the melting point, and the shaping granulation of said drop thing is carried out to granular material with a particle diameter of 6 mm or less. The granular material by which the granulation was carried out is separated from specific gravity liquid by the vibration screen 9. The separated specific gravity liquid (urea solution) is returned to the specific gravity liquid hydrogen tub 10, temperature up of it is again carried out with the heater 11 in said tank 10, is washed by the pump 12, and is returned to the mixing chamber 4.

[0016]On the other hand, the high-density piece of a chlorine content plastic (PVC and PVDC) is discharged from the lower part of the separation tub 7, and is separated from specific gravity liquid (urea solution) by the vibration screen 13. Specific gravity liquid is returned to the specific gravity liquid hydrogen tub 10, and a reuse is carried out similarly.

[0017]At this embodiment, although processing of the film system plastic was explained, it cannot be overemphasized that this invention is applicable also to the waste plastic separated from a bottle system plastic or industrial waste.

[0018]Although content of urea of the urea solution of specific gravity liquid was set to urea:water =10:1 and the temperature of urea solution was 190 \*\* in this embodiment, the content of urea --- urea: --- it can be referred to as water =7:1, the temperature (boiling point) of specific gravity liquid can be about 120 \*\* (it corresponds in a situation) more than PE melting point, and only PE can also be corned and collected.

[0019]

[Effect of the Invention]As heating being possible to the melting point of PE and PP, without using a

predetermined pressurizer by using a urea water content solution as specific gravity liquid according to this invention, as explained above, While separating a chlorine content plastic, and PE and PP from a waste plastic, PE and PP(s) can be corned and collected to the granular material of particle diameter which fitted material recycle as a reducing agent of an iron source, In order not to use a pressurizer, it is advantageous on a process and equipment, and a useful effect is brought about on industry in this way.

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[Translation done.]

て製品を得た。できた印材は、気孔径10～20 $\mu$ 、気孔率約60%、かさ密度0.51g/cm<sup>3</sup>、硬度20°（アスカ-C）、インク含浸率5.4%であった。

【0024】上記実施例の印材を用いて、レーザー加工によって0.1mmの幅の線による文字（漢字の「能」の文字）を彫刻して、比較例と比較した。比較例1は、従来のゴム印（NBR製）、比較例2はポリウレタンの多孔体によるものである。比較例2の多孔体は気孔径40～50 $\mu$ 、気孔率65%であった。比較例1、比較例2ともに、レーザー加工は不可能であった。その理由

＊は、表面が高温になるため粘性（ねちゃつき）がでて、線がつぶれてしまうことと、加工中の悪臭がひどいためである。よって、比較例は型による成型で製造した。

【0025】実験は、まず1回ずつインクパッドに印鑑をつけて、押印した時の文字の鮮明さを比較した。次にインクを十分浸透保持させ、10回以上スタンプパッドなしで押印する時の最初と30回目の文字の鮮明さを比較した。その結果を表1に示す。

【表1】

|      | 臭い | つぶれ | 1回毎 | 1回目 | 30回目 |
|------|----|-----|-----|-----|------|
| 実施例1 | なし | なし  | ○   | ○   | ○    |
| 実施例2 | なし | なし  | ○   | ○   | ○    |
| 実施例3 | なし | なし  | ○   | ◎   | ◎    |
| 実施例4 | なし | なし  | ○   | ◎   | ◎    |
| 比較例1 | 悪臭 | 有り  | ○   | —   | —    |
| 比較例2 | 悪臭 | 有り  | △   | ×   | ×    |

注：臭いは、レーザー加工時に発する臭いである。

つぶれは、レーザー加工時に印材が縮んだり、離れたりして線がつぶれることをいう。

1回毎は、押印する度にインクをつける方法。

1回目は、十分インクを浸透させた後の1回目の押印。

30回目は、十分インクを浸透させた後の30回目の押印。

◎：非常に鮮明

○：鮮明

△：不鮮明

×：再現不能

【0026】表に示す通り、実施例は印鑑として問題なく、比較例1はインクの保持ができなため1回ごとの実験のみであったが、比較例2では気孔が小さすぎたのか、型によって製造したにもかかわらず気孔が潰れているようであった。表から、本発明印材が、特にレーザー彫刻する場合には優れていることが明らかである。

【0027】

【発明の効果】以上詳細に説明した本発明では、次のような大きな効果がある。

(1) 本発明印材では、主材にはSi、C、H、O以

外の原子は含まれていないため、レーザー加工時に悪臭や有毒ガスが発生せず、小さい工場や印鑑販売店でもレーザー加工が可能となる。更に、添加剤もそのようなものを選んだものでは、より効果的である。

(2) 難燃性であるため、レーザー加工で表面が燃えたり、ねちゃったりすることがない。

(3) 気孔率と気孔径が所定の範囲にあるため、押印した時の線等が鮮明で、インクの保持や浸透性も優れている。

## PATENT ABSTRACTS OF JAPAN

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B41K 1/50

(21)Application number : 11-228268

(71)Applicant : TOYO POLYMER CO LTD

(22)Date of filing : 12.08.1999

(72)Inventor : ITO YOSHIKI  
TAKEUCHI ATSUSHI

## (54) SEAL IMPRESSION MATERIAL FOR LASER ENGRAVING

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a seal impression material for laser engraving, which is excellent in a laser processing suitability, a seal stamping performance, and the retaining property and the permeability of an ink by using a polymer, which does not contain atoms other than Si, C, H and O in the molecule, as the major component, making the polymer a continuous porous body, and specifying the pore diameter and the porosity for the whole body.

SOLUTION: A polymer, which is the major component, does not contain atoms other than Si, C, H and O in the molecule. At the same time, the polymer is made a continuous porous body, and in addition, the pore diameter is set to be 0.5 to 60  $\mu$ m. Also, the porosity of the whole body is set to be 30 to 80%. Or, an additive, which does not constitute the molecule of the polymer, being the major component, is added, and at the same time, the additive is made one, which does not generate a malodor and a toxic gas at the time of combustion. By this constitution, a malodor and a toxic gas are not generated at the time of a laser processing, and the laser processing can be performed even in a small factory or store. Also, since the material is flame-retardant, the combustion or the melting is eliminated. In addition, lines or the like at the time of the seal stamping can be made clear, and also, the retention and the infiltration of ink can be improved.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which an invention belongs] This invention relates to a seal material.

[0002]

[Description of the Prior Art]A seal material is the material of a seal, and it will become a seal, if this is sculptured into a character or a pattern, and if necessary and accessories, such as an ink holding fixture, will be attached. The seal was luminaire which collateralizes identity by sealing the sculptured character with cinnabar seal ink. Therefore, that construction material has hardness, is not invaded by cinnabar seal ink etc., and sculptured the complicated character into \*\*\*\*\* and a seal at this purpose.

[0003]However, seal directions other than such an original purpose have also been made in recent years. For example, the seal etc. of what saves the time and effort which writes repeatedly, for example, attendance, and absence are for hiding hasty writing.

[0004]If it is in such a thing, it is cheaper so that a skilled craftsman may not sculpture expensive seal materials (ivory, crystal, a jadestone, etc.) by hand one by one, and what can seal by one ink supply repeatedly is desirable.

[0005]This kind of seals [ many ] are also actually marketed, these are the things of the shape of solid rubber (what ink is not fundamentally absorbed by the member, i.e., is not porosity), or the shape of rubber sponge (an open cell — it is), and the mold in which a desired character and pattern were formed etc. are made to put in and harden them

[0006]

[Problem(s) to be Solved by the Invention]the above-mentioned solid rubber or the rubber sponge-like seal marketed now — ivory and crystal — it should also compare — although there is nothing, even if it compares with a cheap wood seal, complicated characters in which the line of printing is indistinct and fine cannot be expressed.

[0007]If it carries out from the function of security of the identity which is an important function of a seal, characters currently sculptured are complicated as much as possible, and their faked difficult thing is desirable. If a skilled craftsman performs this using seal materials, such as ivory with hardness, it is possible and legal seals are actually made in this way. The manufacture is difficult when asking the seal of the shape of solid rubber which described such a function above, or the shape of rubber sponge. It is difficult for fineness to have a limit, even though it slushes into a mold and manufactures, and to mold distinctly to one thin 1 line. In the thing of a type which holds ink with a sponge material, since a breakthrough is required, it is almost impossible. It usually takes one week from order until equipment for exclusive use is required, and it is very impossible in the seal store of a town, therefore it crosses to a customer's hand, in order to slush into a mold and to manufacture.

[0008]There is a laser process as such high precision processing technology. Although to process solid rubber material and a rubber sponge material was also tried by this method, when material burned, since the offensive odor was severe, it was not able to carry out at all.

[0009]

[Means for Solving the Problem]In view of the above actual condition, a place by which this invention person used to complete this invention seal material wholeheartedly as a result of research, and it is characterized [ the ], Polymer which is a principal member is what does not contain any atoms other than Si, C, H, and O in the intramolecular. This polymer is in a point that it is a continuation stoma object, pore diameters are 0.5-60micro, and the whole porosity is 30 to 80%, and also in other modes, an additive which does not constitute a molecule of principal member polymer is mixed, and this additive is at a point which



is what does not generate an offensive odor or poisonous gas at the time of combustion.

[0010]Material is not a natural object but the 1st feature of this invention is that it is synthetic polymer and that the polymer is what does not contain any atoms other than Si, C, H, and O in intramolecular further. An offensive odor is prevented by not including any atoms other than Si and C, H, and O. Even if it is a case where a manufacture mistake and an extraneous article are discarded, it is rare to become a public nuisance.

[0011]First of all, an offensive odor at the time of rubber and rubber sponge burning or most poisonous gas originates in a sulfur atom, a nitrogen atom, and a chlorine atom. They make various compounds which emit an offensive odor. Therefore, these are prevented nearly thoroughly by these atoms not only not being including, but not including [ whether a malodorous compound is made and ] an atom of others which are not clear, either, and constituting polymer.

[0012]That any atoms other than Si, C, H, and O are not included does not mean that all atoms of Si, C, H, and O are included. What was constituted only from a thing of some of the four above-mentioned atoms, such as a thing which consists of C like what consists only of C and H like polyethylene, and polyether, H, and O, and a thing which consists of Si and O, may be used. In this invention person's experiment, the following polymer was preferred from a viewpoint of an offensive odor and a public nuisance. As what consists only of C and H, polyethylene, polypropylene, styrene-butadiene rubber, butadiene rubber, polyisoprene rubber, isobutylene isoprene rubber, EPDM, etc. are preferred. As what consists of C, H, and O, polyacetal rubber, polyacetaldehyde, polyketene, etc. are preferred. As what consists of four sorts, Si, C, H, and O, dimethyl silicone rubber, methylphenyl silicone rubber, methylvinyl silicone rubber, etc. are preferred.

[0013]A seal material used for this invention is a continuation stoma object of the above-mentioned polymer. This is for carrying out osmosis maintenance of the ink etc.

[0014]By this invention, as a result of a path (diameter of a hole) of a stoma of this continuation stoma object and a stoma inquiring various comparatively (porosity), things became clear here that this should just be a fixed value as a seal material. That is, pore diameters are 0.5-60micro, and porosity is 30 to 80%. At 0.5micro or less, a problem has a pore diameter in osmosis of ink, and a seal becomes indistinct in not less than 60micro. It is because porosity becomes hard as a whole with there being few amounts of maintenance, such as ink, at 30% or less. At least not less than 80% of a seal is indistinct.

[0015]In this invention, ink etc. may be supplied with a stamp pad etc. from the engraving surface side of a seal (stamp), or it may supply from an engraving surface and an opposite hand. To supply from an opposite hand, a stoma needs to be penetrated on both sides, but in a thing of a type supplied from the engraving surface side, the stoma itself may exist only near the engraving surface. An above-mentioned pore diameter and porosity may be a thing about near [ that ] the engraving surface. In this case, what kind of thing may be sufficient as an adjunctive portion which ink etc. do not reach?

[0016]Although a polymer molecule which is a principal member is not constituted, since it is reinforcement, it is moldability improvement and it is compatibility improvement with ink, an additive agent may be added from Reasons for fire-resistant grant etc. For example, a metal oxide, a carbonation thing, a chloride, etc. are an organic platinum complex, carbon, oil, organic acid, ether, alcohol, etc. It is mixed and these are molded together, although a polymer molecule is not constituted. However, they are an inorganic substance and a simple organic matter. In this invention, although it is preferred also for these to make it what does not serve as a generation cause of an offensive odor or harmful gas at the time of combustion, when it is a slight quantity, or when an offensive odor etc. occur only when special, it is not necessary to consider the additive agent itself not much strictly.

[0017]A seal material of this invention may be used only for not the whole but a character of a seal, or a surface portion of a pattern part. In this case, adhesion or weld should just act as both using a seal material which does not correspond to this invention except a surface portion. It may unify and manufacture by co-extrusion etc. Of course, it may adhere in this inventions.

[0018]As a manufacturing method of this invention seal material, although there are following methods, the process in particular itself does not limit.

- (1) Sinter powder or between particles, putting powder or particles of rubber or a plastic in a regime, and carrying out application-of-pressure heating of this. As a result, a detailed continuation stoma is formed. As a pore diameter, 5-400micro are possible.
- (2) Mix in raw material rubber etc. a substance which dissolves in a fixed solvent, make this dissolved solid eluted after vulcanization (bridge construction), and form a detailed continuation stoma.
- (3) Mix in raw material rubber etc. a substance evaporated by external conditions, such as temperature, make it evaporate at the time of sponge molding, and form a continuation stoma.

[0019]A method used now may be used for laser engraving processing, and a method used especially for seal material processing and its method used for rubber processing are good.

[0020]

[Example]As opposed to 100 copies (it is [ a weight section and the following ] the same) of working example 1 synthetic rubbers (S PUREN 501A), Ten copies of fire retardant (Daichi Kigensho Kagaku Kogyo: frame cut L-2), 15 copies of carbon black (Tokai Carbon ceased 6), 100 copies of paraffin series oil (Idemitsu Kosan Diana process oil PW-90), Five copies of zinc oxides (Sakai Chemical Industry 1 No.), five copies of stearic acid (made by Asahi Denka Kogyo), Add 80 copies of ethylene glycol to the thing (the above is called "combination of working example 1") which added 1.5 copies of vulcanizing agents (Nippon Oil & Fats peroxide), and 0.5 copy of accelerator (product made from Ochi new), and with 2 rolls After kneading, The product was obtained by carrying out a press cure at 180 \*\* for 20 minutes, and drying at rinsing and 100 \*\* for 4 hours. The made seal materials were pore diameter 10-20micro, 60% of porosity, and bulk density 0.51g/cm<sup>3</sup>, the hardness of 35 degrees (Aska C), and 54% of an ink rate of impregnation.

[0021]To 100 copies of combination of working example 2 working example 1, 100 copies of calcium carbonate and five copies of acetone are added (the above is called "combination of working example 2"), and it kneads at the temperature of 70 \*\* with a pressurized kneader for 15 minutes. After molding this into a 3.5-mm sheet shaped by a monopodium extruder, it is vulcanized at 180 \*\* for 20 minutes. After rinsing, it dried at 100 \*\* for 4 hours, and the product was obtained until it rinsed after this sheet was immersed in 16.4% of 40 \*\* chloride for 24 hours, and processing and also alkalinity were lost by 1% of sodium hydroxide. The made seal materials were the pore diameters 5-10micro and 65% of porosity.

[0022]To 80 copies of combination of working example 3 working example 2, 100 copies of calcium chlorides and 35 copies of polyoxyethylene polypropylene glycol ether (Toho Chemical Industry pro knurl ST-1) add, and it kneads and molds like working example 2, and it is neglected in 50 \*\* warm water for 24 hours, covering vibrator. After washing, it dried at 100 \*\* for 4 hours, and the product was obtained. The made seal materials were the pore diameters 40-50micro and 75% of porosity.

[0023]100 copies of calcium carbonate with a mean particle diameter of 15 micro and five copies of alcohol are added to 100 copies of working example 4 methylvinyl silicone rubber, and it kneads with a pressurized kneader. The mixture is extruded, by law, it molds into a 10-mm sheet shaped, and vulcanization is performed for 150 \*\* 4 hours. 130 \*\* dried after rinsing for 4 hours, and the product was obtained until it rinsed this after 12-hour immersion to 16.4% of 40 \*\* chloride and processing and also alkalinity were lost with sodium hydroxide solution 1%. The made seal materials were pore diameter 10-20micro, about 60% of porosity, and bulk density 0.51g/cm<sup>3</sup>, the hardness of 20 degrees (Aska C), and 54% of an ink rate of impregnation.

[0024]Using the seal material of above-mentioned working example, with laser processing, the character (character of " \*\*" of a Chinese character) by a 0.1-mm-wide line was sculptured, and it compared with the comparative example. The comparative example 2 is based on the porous body of polyurethane according to the conventional rubber stamp (product made from NBR) in the comparative example 1. The porous bodies of the comparative example 2 were the pore diameters 40-50micro and 65% of porosity. The comparative example 1 and the comparative example 2 were impossible for laser processing. The Reason is because viscosity's (with \*\*\*\*) coming out since the surface's becomes an elevated temperature, and a line's being crushed, and the offensive odor under processing are severe. Therefore, the comparative example was manufactured by molding with a mold.

[0025]The experiment attached the seal to the ink pad 1 time respectively first, and compared the clearness of the character when it seals. Next, osmosis maintenance of the ink was carried out enough, and the clearness of the beginning when sealing without a stamp pad 10 times or more, and the 30th character was compared. The result is shown in Table 1.

[Table 1]

|       | 臭い | つぶれ | 1 回毎 | 1 回目 | 30 回目 |
|-------|----|-----|------|------|-------|
| 実施例 1 | なし | なし  | ○    | ○    | ○     |
| 実施例 2 | なし | なし  | ○    | ○    | ○     |
| 実施例 3 | なし | なし  | ○    | ◎    | ◎     |
| 実施例 4 | なし | なし  | ○    | ◎    | ◎     |
| 比較例 1 | 悪臭 | 有り  | ○    | —    | —     |
| 比較例 2 | 悪臭 | 有り  | △    | ×    | ×     |

注：臭いは、レーザー加工時に発する臭いである。

つぶれは、レーザー加工時に印材が焦えたり、融けたりして線がつぶれることをいう。

1 回毎は、押印する度にインクをつける方法。

1 回目は、十分インクを浸透させた後の 1 回目の押印。

30 回目は、十分インクを浸透させた後の 30 回目の押印。

◎：非常に鮮明 ○：鮮明

△：不鮮明 ×：判読不能

[0026]It seemed that working example is satisfactory as a seal, and it was only the experiment in every time since the comparative example 1 was not able to perform maintenance of ink, but the stoma was crushed by the comparative example 2 in spite of having manufactured with the mold whether the stoma was too small as shown in a table. When this invention seal material carries out especially laser engraving,excelling is clear from a table.

[0027]

[Effect of the Invention]There are the following big effects in this invention explained to details above.

(1) In this invention seal material, since any atoms other than Si, C, H, and O are not contained in the principal member, neither an offensive odor nor poisonous gas is emitted at the time of laser processing, but laser processing becomes possible also in a small factory or a seal store. An additive agent is also more effective what chose such a thing.

(2) Since it is fire retardancy, the surface burns with laser processing or there is no \*\*\*\*\* squirrel \*\*\*\*\*.

(3) Since porosity and a pore diameter are in the predetermined range, a line when it seals etc. are clear and maintenance and perviousness of ink are also excellent.

[Translation done.]



## PATENT ABSTRACTS OF JAPAN

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## (54) CORE MATERIAL FOR LAMINATE, LAMINATE FOR MOLDING AND THEIR MANUFACTURE

(57)Abstract:

PURPOSE: To provide a contamination-free core material for a laminate, a laminate for molding which does not waste and adhesive and their preparation method as well as a core material for a laminate consisting of a uniformly thick primer layer or a uniformly thick adhesive layer and demonstrating superb adhesion with a skin material and its preparation method.

CONSTITUTION: A highly air permeable adhesive layer 12 containing thermally fused polyurethane film is formed on the surface of a core material 11 for a laminate consisting of unwoven cloth fibers, an area between which is impregnated with polyethylene resin, which contain glass fiber and polyethylene fiber. A skin material 13 also consists of unwoven cloth 15 of polyester fiber laminated on one surface of a polyurethane foam 14 and a non-air permeable skin material of an independently foamable polyethylene foam 16 laminated on the other. In addition, a primer layer 17 to which a urethane resin solvent solution is applied and dried is formed on the polyethylene foam 16. The laminate 1 for molding has the primer layer 17 as a skin material obtained by thermally fusing the surface of the adhesive layer 12 of the core 11 for a laminate at 120° C.



## \* NOTICES \*

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention is lightweight, is excellent in an adhesive property, is suitably used as a substrate of the interior material for cars especially accompanied by shaping, and a structural interior material, and relates to a core material for layered products which can be manufactured easily and well, a layered product for shaping, and a manufacturing method for the same.

[0002]

[Description of the Prior Art]It is lightweight as a substrate of the interior material for cars, and a structural interior material, and JP,H2-57333,A has a sound-absorbing material of a description as a thing excellent in sound absorption nature, for example. An inorganic fiber pastes up this thing mutually with thermoplastics, and the skin material which has breathability comes to paste [ this ] the mat state thing which has an opening via the hot melt adhesive layer which has breathability. An inorganic fiber is mutually joined by JP,H2-53948,A with thermoplastics, and the thermoforming nature composite material which the heat adhesive resin layer which does not have a breakthrough comes to paste one side of a mat state thing which has an opening is indicated to it. A polyethylene sheet is laminated to both sides of the mat state thing which becomes JP,S64-77664,A from glass fiber, A polytetrafluoroethylene sheet is assigned to these both sides and the art of carrying out application-of-pressure compression where a polyethylene sheet is heated and fused more than melting temperature, and impregnating with a mat state thing is indicated.

[0003]

[Problem(s) to be Solved by the Invention]Although a thing given in above-mentioned JP,H2-57333,A improves the sound absorption nature in the low frequency region emitted from a car, While using for the car or the interior material for construction, minute dust invades from the hole for aeration of a skin material, this goes into the opening of a mat state thing through the hole for aeration of an adhesives layer, collects into a mat state thing gradually, and spaces a thin skin material and an adhesives layer, and from the outside, this dirt serves as an unsightly spot and appears.

[0004]The thing of a description as well as the thing of the above-mentioned gazette to JP,H2-53948,A, improving the sound absorption nature in a low frequency region, and forming many openings in a mat state thing and a heat adhesion resin layer -- sound absorption nature -- it is going to improve -- the heat adhesive resin layer which is a thing and does not have a breakthrough substantially is used as hot melt adhesive. By heating this to the temperature more than the melting point, a resin layer fuses, of surface tension, it condenses around an inorganic fiber and, as a result, many openings are formed in this heat adhesive resin layer. As a result, dust invades from this opening like a thing given [ above-mentioned ] in a gazette, the opening of a mat state thing is covered, and it becomes unsightly.

[0005]In order to laminate a skin material on the surface of a core material like a mat state thing given in the conventional, for example, the above, gazette, what sprinkled reacting cure type adhesives by the spray nozzle on the surface of the core material beforehand is piled up, and the method of putting this into a mold and fabricating it is performed. However, if adhesives are sprinkled by a spray nozzle in this way, the adhesives more than the specified quantity will be sprinkled and it will become very useless.

[0006]According to the manufacturing method given in JP,S64-77664,A, in a primer, it dries or spreading and the process of providing an adhesives layer are required for the acquired core surface for layered products. What generally makes a nonwoven fabric a core material becomes uneven easily, even if it is not smooth and the surface applies a primer and adhesives for adhesive improvement, and providing the layer whose thickness it is thin and is uniform also has the problem that an adhesive property becomes uneven easily difficult therefore.

[0007] This invention cancels the problem of the above-mentioned conventional moldability composite material, and dirt does not produce it in a core material. It has the primer layer or adhesives layer of a layered product for shaping also without the futility of adhesives, a manufacturing method for the same, and thickness uniform on the surface, and aims at providing an outstanding core material for layered products of an adhesive property with a skin material, and a manufacturing method for the same.

[0008]

[Means for Solving the Problem] A core material for layered products means that by which thermoplastics by which heat melting was carried out was impregnated with a nonwoven fabric. There is a thing of breathability or an air-impermeable thing with a resin amount impregnated, and that by which a thing of adhesive properties, such as a heat resistant resin layer, an adhesives layer, and a primer layer, or barrier nature, etc. were further formed in a nonwoven fabric face where resin was impregnated is also contained. Other materials, such as a skin material, a lining material, and a reinforcing member, are laminated by one side or both sides of the above-mentioned core material for layered products, and since it is fabricated with a die by desired shape, a layered product for shaping is offered.

[0009] Details of this invention are explained below. As an inorganic fiber used for a nonwoven fabric in this invention, glass fiber, carbon fiber, rock wool textiles, ceramic fiber, a metal fiber, etc. are mentioned. As for the length of these textiles, in a manufacture side of a nonwoven fabric, 5-200 mm is preferred, it is 20-100 mm more preferably and it is still more preferred that not less than 50-mm textiles are contained not less than 70%. 3-50 micrometers of diameters of an inorganic fiber are 20-40 micrometers more preferably. If a diameter of an inorganic fiber is smaller than 3 micrometers, a mechanical strength will fall, and if it exceeds 50 micrometers, bulk density of a nonwoven fabric will become large and will become heavy. Since a mechanical strength will fall if it becomes so heavy that it becomes large and becomes small, density of a nonwoven fabric has preferred  $0.01 - 0.2 \text{ g/cm}^3$ , and it is  $0.03 - 0.07 \text{ g/cm}^3$  more preferably. Adequate amount mixing of the organic textiles, such as polyethylene, polypropylene, and saturated polyester, may be carried out at an inorganic fiber. Giving needle punch, in order to raise a mechanical strength of a nonwoven fabric, the density is 10-50 places preferably [ performing  $1 \text{ cm}^2$  per 1-100 places ] and more preferably.

[0010] Thermoplastics used since a core material for layered products is constituted, Many inorganic fibers are combined mutually and a thing of a low melting point should just be mentioned comparatively polyethylene, polypropylene, polyester, nylon, polyamide, polystyrene, a polyvinyl butyral, VCM/PVC, polybutylene terephthalate, etc. The above-mentioned thermoplastics is used in the state, such as an emulsion distributed by film state, powder, or solvent. In the case of a thermoplastic resin film, thickness is equally or slightly as thin as thickness of a nonwoven fabric, and its 10-300 micrometers are preferred.

[0011] In order to impregnate with thermoplastics a nonwoven fabric which consists of inorganic fibers, it can impregnate with melting resin between textiles of a nonwoven fabric by laying this resin film in a nonwoven fabric face, and pressurizing a nonwoven fabric, where heat melting of this is carried out. When using thermoplastic resin powder, although impregnated with a nonwoven fabric, it can be considered as a core material for layered products which has an opening by making it distribute between textiles of a nonwoven fabric, and heating powder of 50-100 meshes more than the melting point of thermoplastics. In order to use thermoplastics by an emulsion, a core material for layered products can be obtained by immersing a nonwoven fabric in this emulsion and heating after drying this more than the melting point of thermoplastics.

[0012] In order to receive a core material for layered products a moldability, sound absorption nature, adiathermancy, etc., it is preferred to make dimension height give. As this means, after impregnating a nonwoven fabric with melting resin, there is a method of making the original state recover thickness of a nonwoven fabric according to elastic restoring force of an inorganic fiber by carrying out predetermined time maintenance in the non-energized state with temperature more than melting temperature of this thermoplastics, for example. Although resin fused like a Teflon sheet is pasted, Where it allocated in both sides of a core material for layered products an extension member which exfoliates easily when pasted-up resin cooled, and resin and an extension member of a core material for layered products which carried out heat melting are pasted up, By making it move to a method of the outside of a thickness direction of a core material for layered products with a vacuum absorption device etc., and making thickness of a core material for layered products increase compulsorily, an inside is made to produce an opening and it can be made bulky.

[0013] As for the layered product for shaping according to claim 1, a thermal melting arrival type adhesives layer is formed in one side of the above-mentioned core material for layered products. As thermal melting

arrival type adhesives, a film, polyurethane adhesive, etc. which consist of these mixtures, such as polyethylene, an ethylene-vinylacetate copolymer, an ethylene-ethyl acrylate copolymer, polyester, and polyamide, are mentioned. In order to form the above-mentioned thermal melting arrival type adhesives layer in a core surface for layered products, it applies directly using 2 or 3 roll coaters, a reverse roll coater, a gravure roll coating machine, and a direct roll coater, or the conventional laminating method by extrusion lamination etc. is adopted. What can be fabricated to film state may once be fabricated to film state by T die or an inflation die, and may laminate this with thermal melting arrival, adhesives, etc. to a core surface.

[0014]A nonwoven fabric is impregnated in resin, and since the surface is smooth what made thickness of a core material for layered products increase using said extension member and a vacuum absorption device, and made this bulky, a thermal melting arrival type adhesives layer applied to this field does not have a discontinuous part superficially.

[0015]If provide a thermal melting arrival type adhesives layer in one side of a thermoplastic resin film by which being melting impregnated is carried out beforehand, and carry out an adhesives layer outside, the above-mentioned film is piled up on a nonwoven fabric, heat melting of this film is carried out and it impregnates with film resin. Although an adhesives layer is also fused with heat which fuses a film and some adhesives enter an opening of a nonwoven fabric with melting resin, most adheres and remains in textiles on the surface of a nonwoven fabric. It contracts with surface tension, an opening is produced, and an adhesives layer which has a discontinuous part superficially can be formed in the nonwoven fabric surface. If it does in this way, an adhesives layer can be formed in a nonwoven fabric face simultaneously with resin impregnation, and the adhesives layer has breathability.

[0016]In order to give breathability to a thermal melting arrival type adhesives layer applied to a core surface for layered products after resin impregnation, If applied adhesives are heated more than the melting point and fused, since many nearby and minute holes will be formed in contracting adhesives with surface tension and an inorganic fiber breaking through an adhesives layer, breathability is given.

[0017]When an adhesives layer has breathability and an air-impermeable thing and an adhesives layer are an air-impermeable thing, as for a skin material pasted up on the above-mentioned adhesives layer, what has breathability may be used. A synthetic resin foam sheet which has a closed cell as an air-impermeable skin material, for example, There are some etc. by which a non-foaming plastic sheet, these, textile fabrics, etc. were laminated, and textile fabrics or a nonwoven fabric formed, for example by a urethane foam sheet, a VCM/PVC foaming sheet, a polypropylene fiber, polyester fiber, etc. of an open cell is mentioned as a skin material which has breathability.

[0018]In order to choose an air-impermeable skin material and to paste this together to an adhesives stratification plane which has breathability, if only a primer layer may be provided in a lamination side of a skin material and also an adhesives layer of a core material for layered products and an affiliated adhesives layer are formed in a primer layer side, the reliability of adhesion will become high further. Since air bubbles involved in the meantime go into an opening which a core material for layered products opened for free passage through a vent of an adhesives layer and escape from a side on the other hand when pasting an air-impermeable skin material together to this stratification plane when an adhesives layer and a core material have breathability, air bubbles do not remain in a lamination side. And dust does not invade from an air-impermeable skin material.

[0019]So that breathability may not arise by adhesives' fusing, contracting with the surface tension, and producing an opening, when pasting together to an air-impermeable adhesives stratification plane a skin material which has breathability, Apply thermal melting arrival type adhesives more thickly, where thermofusion of this is carried out, may pressurize a skin material in piles, but. Since reliability for pasting up after it formed a primer layer or an adhesives layer of a core surface for layered products, and an affiliated adhesives layer in a lamination side of a skin material via a primer layer and both adhesives layers have carried out thermofusion to lose the breathability of adhesives becomes high, it is desirable.

[0020]Thus, spraying of reacting cure type adhesives by a spray nozzle which was performed conventionally becomes unnecessary by forming a thermal melting arrival type adhesives layer in a core surface for layered products.

[0021]Since at least one of an adhesives layer formed in a core surface for layered products, a core material, and the skin materials is made with air-impermeability, dirt by dust being entered and accumulated in a core material for layered products does not generate a layered product for shaping of above-mentioned Claim 1. Without air bubbles remaining in a lamination side, since it is not necessary to sprinkle reacting cure type adhesives by a spray nozzle, reliable adhesion can be obtained with few adhesives.

[0022]Next, a heat resistant resin layer by which at least one side of a core material for layered products



which comes to join mutually textiles of a nonwoven fabric which consists of inorganic fibers with thermoplastics comes to laminate the layered product for shaping according to claim 2. It comes to laminate the above-mentioned core material for layered products, and a skin material via a thermal melting arrival type adhesives layer formed at least in one side with a skin material stuck on this layer.

[0023]The thing as an invention described in Claim 1 with this same core material for layered products is used. It prevents intercepting thoroughly circulation of air which is laminated by at least one side of a core material for layered products, and lets a skin material and an adhesives layer pass, dust's collecting on an inside of a core material for layered products, and a heat resistant resin layer becoming unsightly. If a primer layer or an adhesives layer is formed in this stratification plane, an adhesive property with a skin material can be improved further.

[0024]As a heat resistant resin layer, they are polybutylene terephthalate, saturated polyester, polycarbonate, polyamide, polyurethane, and these conversion things, when melting temperature and a layered product for shaping of adhesives are fabricated by desired shape, melting temperature is higher than molding temperature received within a mold — it is a thing of a high-melting point comparatively. Heat resistant resin is used in order for this resin layer to prevent melting and flowing, forming fine pores and becoming breathability with heat which a thermal melting arrival type adhesives layer receives when pasting up, and heat at the time of shaping.

[0025]A heat resistant resin layer could be laminated by a method by adhesion and thermal melting arrival which a co-extrusion is carried out to adhesive resin, such as polyethylene, and are laminated via polyethylene resin of a molten state by core surface for layered products, or are with adhesives, etc. A laminated film in which the above-mentioned high-melting point resin and low melting point resins whose melting point is lower than this were laminated as for a heat resistant resin layer. The low-melting-point-resins side was laid on top of a core surface for layered products, and this laminated film was heated, and low melting point resins were fused and it could be formed by leaving and impregnating a core surface for layered products with high-melting point resin.

[0026]A skin material is laminated by this heat resistant resin layer side via an adhesives layer. It is [ skin material / this ] usable in the same thing as an invention described in Claim 1, i.e., a thing which has breathability, an air-impermeable thing, and all. What has breathability also about an adhesives layer, and an air-impermeable thing can also be used. Since an adhesive property will become still better if corona discharge treatment is performed to a heat resistant resin layer side or a primer layer is formed, it is desirable. This layered product for shaping An adhesives layer is provided in a heat resistant resin layer side, skin material sides, or these both sides, and a core material for layered products and a skin material paste up.

[0027]A manufacturing method of the layered product for shaping according to claim 3, With thermoplastics, are the method of manufacturing a layered product for shaping of a description to above-mentioned Claim 2, and textiles of a nonwoven fabric which consists of inorganic fibers laminate a heat resistant resin layer at least on one side of a core material for layered products which it comes to join mutually, and it This heat resistant resin layer, A thermal melting arrival type adhesives layer is formed at least in one side with a skin material pasted together to this layer, and the above-mentioned core material for layered products and a skin material are pasted together via this adhesives layer.

[0028]The same thing as the heat resistant resin according to claim 2 is used for a heat resistant resin layer. What is necessary is to co-extrude said heat resistant resin with adhesive resin, such as polyethylene, to a core surface for layered products, and to laminate it via polyethylene resin of a molten state to it, or just to laminate by a method by adhesion and thermal melting arrival using adhesives, etc., in order to laminate a heat resistant resin layer to a core surface for layered products. This adhesives layer may be formed in a heat resistant resin layer side, and may be formed in a lamination side of a skin material, and may be formed in these both sides. Since an adhesive property will become still better if corona discharge treatment and primer coating are performed to a heat resistant resin layer side, it is desirable.

[0029]In order to form an adhesives layer in a heat resistant resin layer side or a skin material side, the conventional coating method by 2 or 3 roll coaters, reverse roll coater, gravure roll coating machine, direct roll coater, extrusion lamination, etc. is adopted.

[0030]By passing a sticking-by-pressure roll etc., for example, and cooling after that, carrying out heat melting of the thermal melting arrival type adhesives layer formed in ones of these fields, or both field, and piling up in the state, in order to laminate a core material for layered products, and a skin material. Or an adhesives layer is carried out inside and piled up, and after being stuck by pressure at the same time it carries out heat melting of the adhesives layer, making a hot calender roll etc. pass this, it can cool and

laminate. Pressures between rolls, such as cooking temperature in this case and a sticking-by-pressure roll, can be suitably chosen with a kind of thermal melting arrival type adhesives to be used, thickness of a core material for layered products, etc.

[0031]By pressing piling up a core material for layered products, and a skin material, putting in a mold which has the shape of a request of this, and heating with melting temperature of an adhesives layer, Or by heating a core material for layered products, and a skin material, piling this up, and putting in and pressing in a mold, if size enlargement is carried out to desired shape simultaneously with lamination, a product can be manufactured well.

[0032]A thermal melting arrival type adhesives layer which a heat resistant resin layer is laminated by at least one side of a core material for layered products which comes to join mutually textiles of a nonwoven fabric which consists of inorganic fibers with thermoplastics, and comes to form the layered product for shaping according to claim 4 in this stratification plane, A skin material which has breathability sticks and it comes to unite it.

[0033]What has a thermal melting arrival type adhesives layer the same as an invention described in Claim 2 formed in this core material for layered products, a heat resistant resin layer, and this stratification plane is used. As a skin material which has breathability, textile fabrics or a nonwoven fabric formed by a urethane foam sheet, a VCM/PVC foaming sheet, a polypropylene fiber, and polyester fiber of an open cell is mentioned.

[0034]Even if it does not provide an adhesives layer in the above-mentioned skin material side, it can paste up, if a lamination side of this skin material is simultaneously heated with a thermal melting arrival type adhesives layer currently formed in a heat resistant resin layer side for pasting together to a core material. However, a thermal melting arrival type adhesives layer which may provide an adhesives layer also in that surface depending on construction material and its surface state of a skin material, and has breathability in this case is preferred. As such an adhesives layer, a film, polyurethane adhesive, etc. which consist of these mixtures, such as polyethylene, an ethylene-ethyl acrylate copolymer, an ethylene-vinylacetate copolymer, polyester, and polyamide, are mentioned. In order to form an above-mentioned thermal melting arrival type adhesives layer in a core material for layered products, a conventional method by 2 or 3 roll coaters, reverse roll coater, gravure roll coating machine, direct roll coater, extrusion lamination, etc. is adopted. What was fabricated by film state may be pasted together to a core material with thermal melting arrival or adhesives.

[0035]If adhesives applied, for example are heated more than the melting point and fused, in order to give breathability to a thermal melting arrival type adhesives layer, since many nearby and minute holes will be formed in contracting fused adhesives with surface tension, and an inorganic fiber breaking through an adhesives layer, breathability is given.

[0036]A Reason for using a heat resistant resin layer is that it is the same as a Reason explained by explanation of said Claim 2, and dust which has passed along a skin material and an adhesives layer which have breathability by this is intercepted thoroughly, and dust does not collect on a core material for layered products.

[0037]A manufacturing method of the layered product for shaping according to claim 5, Are the method of manufacturing a layered product for shaping of a description to above-mentioned Claim 4, and textiles of a nonwoven fabric which consists of inorganic fibers laminate a heat resistant resin layer at least on one side of a core material for layered products which it comes to join mutually with thermoplastics, A thermal melting arrival type adhesives layer is formed in this stratification plane, and this adhesives layer and a skin material are pasted together.

[0038]Therefore, that for which all of a core material for layered products and a heat resistant resin layer which are used here, a thermal melting arrival type adhesives layer, and a skin material were used by the invention according to claim 4 is used. In order to laminate a core material for layered products, and a skin material, an adhesives layer of a heat resistant resin layer side of a core material for layered products, . [ whether heat melting of the adhesives layer of a skin material side is carried out, it is piled up, a sticking-by-pressure roll is passed, and it back-cools, and ] Or piling up both adhesives stratification plane and passing a hot calender roll for this, from the outside of a skin material or a core material for layered products, with melting temperature of an adhesives layer, carry out heat melting of the adhesives layer, and it is stuck by pressure, It puts in a mold which cools after that, or piles both up and has desired shape, and methods, such as carrying out size enlargement simultaneously with lamination, can be adopted by pressing heating with melting temperature of an adhesives layer.

[0039]An adhesives layer of a core material for layered products to which it comes to form a thermal melting arrival type adhesives layer to which it is mutually joined with thermoplastics and textiles of a

nonwoven fabric in which the layered product for shaping according to claim 6 consists of inorganic fibers have breathability on the whole surface, A primer layer or a thermal melting arrival type adhesives layer formed in this heat resistant resin layer side of an air-impermeable skin material with which a heat resistant resin layer was laminated by the whole surface on the other hand sticks, and it comes to unite it. [0040]A core material for layered products used here is the same as an invention described in Claim 1, and an adhesives layer which has the breathability according to claim 1 on the whole surface of this core material for layered products is formed. An air-impermeable skin material Plastic fiber, such as polypropylene, polyethylene, polyamide, and polyurethane, It consists of natural fibers, such as cotton and hemp, or two or more sorts of these mixtures, That etc. by which air-impermeability, a made thing, a synthetic resin foam sheet which has a closed cell, a non-foaming plastic sheet, these, textile fabrics, etc. were laminated further are mentioned to the whole surface of thing textile fabrics or a nonwoven fabric in which needle punch was given by laminating an air-impermeable heat resistant resin layer. A film which consists of polybutylene terephthalate, saturated polyester, polycarbonate, polyurethane, and these conversion things as the above-mentioned heat resistant resin layer is used.

[0041]A primer layer or a thermal melting arrival type adhesives layer is formed in the above-mentioned heat resistant resin layer side. That for which this primer layer is generally used [ system / an epoxy system, a phenol system, / polyurethane ] as a primer is mentioned. Only a primer layer or an adhesives layer may be formed in a heat resistant resin layer side, a primer layer may be formed and an adhesives layer may be formed on it.

[0042]An adhesives layer of a core material for layered products, a primer layer of a skin material, or an adhesives layer is stuck, and it is made with a layered product for shaping. As for a method of pasting together, said method according to claim 4 is adopted. Thus, since a skin material is made with air-impermeability, a becoming layered product for shaping spaces a skin material, and since dust does not go into a core material for layered products, it does not produce dirt.

[0043]A manufacturing method of the layered product for shaping according to claim 7, Textiles of a nonwoven fabric which consists of inorganic fibers form an adhesives layer which has thermal melting arrival type breathability on the whole surface of a core material for layered products which it comes to join mutually with thermoplastics, On the other hand, a heat resistant resin layer is laminated on the whole surface, and a primer layer of an air-impermeable skin material in which a primer layer or a thermal melting arrival type adhesives layer was formed to this heat resistant resin layer side or an adhesives layer, and an adhesives layer that has the above-mentioned breathability are pasted together.

[0044]This method is a method of manufacturing the layered product for shaping according to claim 6, therefore what has both [ the same as an invention described in Claim 6 ] a core material for layered products, a skin material a heat resistant resin layer a primer layer and an adhesives layer is used. As for a method of pasting together, said method according to claim 6 is adopted. Since the air bubbles involved in between a core material for layered products and a skin material when pasting together can escape from an adhesives layer which has breathability to an opening in a core material for layered products, air bubbles do not remain among both.

[0045]A thermoplastic resin film in which it comes to form a primer layer in one side the layered product for shaping according to claim 8, By piling up and carrying out melting to the whole surface of a nonwoven fabric which carries out this primer layer side outside, and consists of inorganic fibers, leaving a primer layer to the whole surface of this nonwoven fabric, and impregnating the above-mentioned film resin between textiles, Textiles are joined mutually and a reacting cure type adhesives layer is formed at least in one side with a skin material stuck on a primer layer and this layer of a core material for layered products which comes to form a primer layer in the whole surface of a nonwoven fabric, and via this adhesives layer, a core material for layered products and a skin material stick, and it comes to unite them.

[0046]As resin of a thermoplastic resin film, thermoplastics impregnated with said core material for layered products is used, and this is fabricated by film state. As for the thickness, 10-300 micrometers is preferred, and the surface where a primer is applied is still more preferred if corona discharge treatment has been performed. As a primer, things currently generally used as a primer, such as an epoxy system, a phenol system, and a polyurethane system, are mentioned. As for thickness of a primer layer formed in a film plane, about 10-50 micrometers is preferred.

[0047]A nonwoven fabric used here is the same as said nonwoven fabric according to claim 1. The above-mentioned film in which it comes to form a primer layer carries out a primer layer outside, is piled up on the whole surface of a nonwoven fabric, and this layered product for shaping is heated more than that melting temperature, Nonwoven fabric textiles are mutually joined with resin by carrying out melting of the film resin, leaving a primer layer to the nonwoven fabric surface, and being impregnated between textiles,

and since it leaves a primer layer on the surface of a nonwoven fabric and is impregnated, a core material for layered products by which a primer layer was formed in the nonwoven fabric surface is used. A primer layer formed in a nonwoven fabric face may be a thing of breathability which has countless fine pores. A core material for layered products and a skin material are stuck via a reacting cure type adhesives layer by which this layered product for shaping was formed in a primer layer, skin materials, or these both sides. As a reacting cure type adhesives layer, things, such as an epoxy system, a polyurethane system, a polybutadiene system, a silicon system, and a formaldehyde system, can be used.

[0048]A manufacturing method of the layered product for shaping according to claim 9, A thermoplastic resin film in which it comes to form a primer layer in one side is piled up on the whole surface of a nonwoven fabric which carries out this primer layer outside and consists of inorganic fibers, By carrying out heat melting of this thermoplastic resin film, leaving a primer layer to the nonwoven fabric surface and being impregnated, Join textiles mutually and a core material for layered products which forms the above-mentioned primer layer in the whole surface of a nonwoven fabric is \*(ed), A reacting cure type adhesives layer is formed at least in one side with a skin material pasted together to the above-mentioned primer layer and this layer, and a core material for layered products and a skin material are pasted together via this adhesives layer.

[0049]A manufacturing method of this layered product for shaping is a method of manufacturing a layered product for shaping given in above-mentioned Claim 8, therefore all materials used here are the same as what is used by Claim 8.

[0050]In this invention, this primer layer is used as the outside, i.e., a nonwoven fabric and an opposite hand, a thermoplastic resin film in which it comes to form a primer layer in one side is piled up, and if heat melting of this film is carried out, film resin will be impregnated with a nonwoven fabric. Therefore, if a resin body product of a film of a definite area is larger than pore volume which a nonwoven fabric of the area has, an opening of a nonwoven fabric will be filled with resin, A primer layer which continued superficially is formed in the nonwoven fabric surface, and if this resin body product is smaller than pore volume of a nonwoven fabric, Although film resin decreases to be left behind to the nonwoven fabric surface, a primer is left behind to textiles on the surface of a nonwoven fabric, it becomes the layer which formed many discontinuous portions superficially and a nonwoven fabric will be in the state of having breathability, this shall also be included in a primer layer of this invention. However, in view of set density of nonwoven fabric textiles, when a primer exists in each surface textiles, an adhesive property becomes very good.

[0051]If a thing which has melting temperature higher than this film, for example, things, such as a fluororesin sheet, is turned to a nonwoven fabric, they are assigned and are pressurized from on a melting film when impregnating with film resin, it can be impregnated easily. By giving dimension height to a core material for layered products, much fine pores may be formed also in this primer layer, and it may be made with a primer layer of breathability.

[0052]Even if it applied a primer to a core surface for layered products conventionally, a core surface for layered products becomes uneven [ thickness ] for unevenness by nonwoven fabric textiles, and an adhesive property became uneven easily, but, Since a primer layer with uniform thickness can be formed even if a core material for layered products has a discontinuous part in the nonwoven fabric surface by having composition of this invention, an adhesive property with a skin material becomes the constantly outstanding thing. Since a primer layer can be formed in the surface at the same time as it carries out resin impregnation to a nonwoven fabric, it is not necessary to once manufacture a core material for layered products like before, and to carry out spreading desolcation of the primer on this surface, and is dramatically efficient also in manufacture of a core material for layered products.

[0053]A core material and a skin material are pasted up by a reacting cure type adhesives layer formed at least in one side of a primer layer of a core material for layered products and a skin material with which it comes to form a primer layer in the whole surface of the above-mentioned nonwoven fabric. It may place into a die which has the shape of in piles a request of a core material for layered products, and a skin material, this may be pressed, and it may fabricate in desired shape simultaneously with adhesion.

[0054]Next, a manufacturing method of the core material for layered products according to claim 10, By laying a low melting point resin layer of a laminated film in which it comes to laminate a high-melting point resin layer and a low melting point resin layer on top of a nonwoven fabric which consists of inorganic fibers, heating this laminated film, fusing only a low melting point resin layer, and impregnating with a nonwoven fabric, A high-melting point resin layer is formed in the whole surface of a nonwoven fabric, and a thermal melting arrival type adhesives layer is formed in this high-melting point resin layer side.

[0055]High-melting point resin refers to what is used as a heat resistant resin layer described by explanation of said Claim 2, and is a thing of a high-melting point comparatively. Low melting point resins

point out thermoplastics impregnated with a nonwoven fabric described by explanation of said Claim 1, and are the things of a low melting point comparatively. By a molten state, each of above-mentioned high-melting point resin layers and low melting point resin layers could be extruded from a metallic mold, and melt adhesion could be carried out as it was. Each resin was independently fabricated to film state, and adhesive resin could be laminated via a thing by which melting was carried out, or adhesives in this.

[0056]A low melting point resin layer of the above-mentioned laminated film is piled up, this laminated film is heated to one side or both sides of a nonwoven fabric which were described by explanation of Claim 1 more than melting temperature of a low melting point resin layer, and a low melting point resin layer is fused to them, and they are impregnated with this resin layer at a nonwoven fabric. The one of cooking temperature lower than melting temperature of a high-melting point resin layer is preferred. If application-of-pressure compression of the laminated film which a low melting point resin layer fused is carried out to a thickness direction of a nonwoven fabric, it can be impregnated promptly.

[0057]If only a low melting point resin layer is fused and a nonwoven fabric is impregnated, a high-melting point resin layer which is not fused will be left behind to the nonwoven fabric surface, and a core material for layered products will be obtained. If this laminated film is piled up on both sides of a nonwoven fabric and it carries out being melting impregnated of the low melting point resin layer, a core material for layered products which has a high-melting point resin layer to both sides will be obtained.

[0058]A thermal melting arrival type adhesives layer used here is the same as what was described by said Claim 1. In order to form this adhesives layer in a high-melting point resin layer side, same method as what was described by said Claim 1 is employable, but beforehand, a primer may be applied to a high-melting point resin layer side of a laminated film, and a method adhesives layer of thermal melting arrival may be laminated on this.

[0059]An extension member like a glass fiber strengthening polytetrafluoroethylene sheet which exfoliates easily is pasted up on both sides of a nonwoven fabric with which low melting point resins were impregnated. By making it move to a method of the outside of a thickness direction of a core material for layered products with a vacuum absorption device etc., where resin and an extension member of a core material for layered products which carried out heat melting are pasted up, thickness of a core material for layered products is made to increase compulsorily, and it can be made bulky.

[0060]According to this invention, while carrying out being melting impregnated of the low melting point resin layer of a laminated film laminated by one at a nonwoven fabric, a high-melting point resin layer can be formed in this nonwoven fabric surface, and a core material for layered products can be manufactured very efficiently. And adhesive strength to a nonwoven fabric face of a high-melting point resin layer is dramatically excellent. Thus, a core material for layered products obtained carries out heat melting of the adhesives layer of the \*\*\*\* high-melting point resin layer side, pastes a skin material etc. together, and is made with a layered product for shaping.

[0061]A nonwoven fabric in which the core material for layered products according to claim 11 consists of inorganic fibers comes to impregnate a low melting point resin layer, and a high-melting point resin layer is formed in the whole surface at least, and also a high-melting point resin layer side comes to laminate a thermal melting arrival type adhesives layer. The nonwoven fabric used here can use what was described by explanation of Claim 1. What stated a low melting point resin layer and a high-melting point resin layer by said Claim 7 is adopted.

[0062]In order to form a high-melting point resin layer in a nonwoven fabric face where a low melting point resin layer was impregnated, a method of above-mentioned Claim 10 is preferred, but. After \*(ing) that by which low melting point resins were beforehand impregnated with a nonwoven fabric, it should be pasted together by a method and adhesives which laminate a high-melting point resin layer, for example via melting polyethylene resin etc. on this surface. If corona discharge treatment is performed to a high-melting point resin layer side of an obtained core material for layered products or a primer layer is formed in it. Since an adhesive property becomes much more good, it may be desirable, and a direct thermal melting arrival type adhesives layer may be formed in a high-melting point resin layer, or a thermal melting arrival type adhesives layer may be formed in the above-mentioned corona-discharge-treatment side or a primer layer side.

[0063]A manufacturing method of the core material for layered products according to claim 12, A primer layer or a thermal melting arrival type adhesives layer is formed in the whole surface of a thermoplastic resin film. By carrying out a this primer or thermal melting arrival type adhesives layer outside, laying on top of a nonwoven fabric, carrying out heat melting of the above-mentioned film, leaving a primer layer or a thermal melting arrival type adhesives layer to the nonwoven fabric surface, and impregnating with it, A primer layer or a thermal melting arrival type adhesives layer is formed in the surface of a nonwoven fabric.

[0064]A thermoplastic resin film points out a film which consists of thermoplastics impregnated with a nonwoven fabric described by explanation of said Claim 1, and is a thing of a low melting point comparatively. The nonwoven fabric can use what was described by Claim 1. As a primer layer, things currently generally used as a primer, such as an epoxy system, a phenol system, and a polyurethane system, are mentioned. As thermal melting arrival type adhesives, a film, polyurethane adhesive, etc. which consist of these mixtures, such as polyethylene, an ethylene-vinylacetate copolymer, an ethylene-ethyl acrylate copolymer, polyester, and polyamide, are mentioned.

[0065]In order to form a primer layer or a thermal melting arrival type adhesives layer in the whole surface of a thermoplastic resin film, if it is a primer, it will apply directly by various kinds of roll coaters. If it is a thermal melting arrival type adhesives layer, a laminating method, such as pasting together what extruded and fabricated lamination by lamination etc. or thermal melting arrival type adhesives to film state, will be adopted. By using a primer layer or a thermal melting arrival type adhesives layer as the outside, i.e., an opposite hand of a nonwoven fabric, piling up the above-mentioned thermoplastic resin film on a nonwoven fabric, heating this film more than the melting temperature, and carrying out melting, It leaves a primer layer or a thermal melting arrival type adhesives layer to the nonwoven fabric surface, and film resin is impregnated.

[0066]A thermoplastic resin film which has the above-mentioned primer layer or a thermal melting arrival type adhesives layer may be piled up on one side of a nonwoven fabric, and it may carry out being melting impregnated, it may lay on top of both sides of a nonwoven fabric, and may carry out being melting impregnated from both sides.

[0067]If there are few resin body products of a thermoplastic resin film of a definite area more fairly than pore volume of a nonwoven fabric of the area, Fused film resin is condensed around nonwoven fabric textiles with surface tension, Although it becomes what produces many openings and has breathability and a part of primer layer or adhesives layer enters an opening of a nonwoven fabric with melting resin, most adheres to textiles on the surface of a nonwoven fabric, and although it is superficially discontinuous, a primer layer which has breathability, or an adhesives layer is formed.

[0068]If a resin body product of a thermoplastic resin film of a definite area is close to pore volume of a nonwoven fabric of the area, film resin will be impregnated with the whole nonwoven fabric, it will become air-impermeability, and a primer layer or an adhesives layer will also become the air-impermeable thing which continued superficially.

[0069]In order to raise adhiatermancy, sound absorption nature, a moldability, etc. to an obtained core material for layered products, For example, pile up a laminated film on both sides of a nonwoven fabric, and further to this laminated film side. An extension member like a glass fiber strengthening polytetrafluoroethylene sheet which exfoliates easily is pasted up, By making it move to a method of the outside of a thickness direction of a core material for layered products with a vacuum absorption device etc., where resin and an extension member of a core material for layered products which carried out heat melting are pasted up, thickness of a core material for layered products is made to increase compulsorily, and it can be made bulky.

[0070]According to a method of this invention, at the same time as it carries out being melting impregnated of the thermoplastics at a nonwoven fabric, a primer layer or a thermal melting arrival type adhesives layer can be formed in this nonwoven fabric face, and a core material for layered products can be manufactured well. The surface can form a uniform and thin primer layer or an adhesives layer in a nonwoven fabric face which is not smooth, and a core material for layered products which has the adhesive property which was uniform and was excellent can be obtained.

[0071]Thus, a core material for layered products obtained pastes a skin material etc. together to a high-melting point resin layer side via an adhesives layer, and is made with a layered product for shaping.

[0072]The core material for layered products according to claim 13 is what is produced by inventing above-mentioned Claim 12, A thermoplastic resin film in which it comes to form a primer layer or a thermal melting arrival type adhesives layer in the whole surface carries out a primer layer or a thermal melting arrival type adhesives layer outside, and is piled up on a nonwoven fabric, Thermofusion of the above-mentioned film is carried out, and it leaves a primer layer or a thermal melting arrival type adhesives layer to the nonwoven fabric surface, is impregnated, and comes to form a primer layer or a thermal melting arrival type adhesives layer in the surface of a nonwoven fabric.

[0073]Therefore, explanation of Claim 12 describes all materials used. A nonwoven fabric in which a thermoplastic resin film with few resin amounts, i.e., a film with thin thickness, was impregnated as compared with the amount of openings of a nonwoven fabric becomes a thing of breathability, and a primer

layer or a thermal melting arrival type adhesives layer formed in the surface also becomes a thing of breathability. Therefore, a grade of breathability can be made into various things by choosing fiber density of a nonwoven fabric, thickness, and thickness with a thermoplastic resin film.

[0074] Since a primer layer whose thickness it is thin and is uniform, or a thermal melting arrival type adhesives layer is formed in the surface, a core material for layered products by this invention has a uniform adhesive property with other materials, such as a skin material, is excellent, and also enables selection of breathability. It could be laid on top of one side of a nonwoven fabric, and being melting impregnated could be carried out, a thermoplastic resin film could be piled up on both sides of a nonwoven fabric, and being melting impregnated could be carried out, that with which resin was impregnated from both sides can be made into a layered product which looked a skin material like [ one side ] on the other hand, and laminated a lining material etc., for example.

[0075]

[Function] According to the layered product for shaping of Claims 1, 2, 4 and 6, since the dust in which all invaded from the vent of the skin material and the adhesives layer does not go into the opening of the core material for layered products of this layered product for shaping, the core material for layered products does not become dirty. Since the adhesives layer is beforehand formed at least in one side of the core material for layered products, and a skin material, it is unnecessary, and there are few adhesive amounts, and they end, and the adhesives sprinkled to an adhesion side become what has the high reliability of adhesive strength.

[0076] In the layered product for shaping according to claim 8, since a primer layer with uniform thickness can be formed in the nonwoven fabric surface, it becomes the adhesive outstanding thing, and the fixed adhesive property with a skin material is acquired.

[0077] Since a thermal melting arrival type adhesives layer is stuck on a heat resistant resin layer side according to the manufacturing method of the layered product for shaping given in Claims 3, 5 and 7, even if an adhesives layer serves as breathability, the open air is intercepted by the heat resistant resin layer, and can manufacture well the layered product for shaping by which dust does not go into the core material for layered products. It is not necessary to spray hardened type adhesives by a spray nozzle etc., and can manufacture with a small amount of adhesives.

[0078] According to the manufacturing method of the layered product for shaping of Claim 9, the layered product which has a primer layer thin thickness and uniform on the nonwoven fabric surface can be manufactured efficiently. And it is not necessary to apply a primer and to dry like before.

[0079] Since the thermal melting arrival type adhesives layer is laminated by the high-melting point resin layer side on the surface of a nonwoven fabric where the low melting point resin layer was impregnated, by [ the ] carrying out \*\*\* heating and fusing an adhesives layer, this core material can be pasted together to a skin material etc., and the core material for layered products according to claim 11 can make it the layered product for shaping.

[0080] Since the primer layer thin thickness and uniform or the adhesives layer is formed in the nonwoven fabric face where resin was impregnated, the core material for layered products according to claim 13 has a dramatically good adhesive property with other materials.

[0081] According to the manufacturing method of Claim 10 and the core material for layered products given in 12, at the same time as all fuse thermoplastics and a nonwoven fabric is impregnated with them, a high-melting point resin layer, a primer layer, or an adhesives layer can be formed in the nonwoven fabric surface by uniform thickness.

[0082]

[Example] Working example of the layered product for this invention shaping is described below.

[0083] (Working example 1) 60 mm in length, and the chop strand which consists of glass fiber 13 micrometers in diameter, Needle punch was given to the floc which interweaves the polyethylene fiber of 6 deniers and a 50-mm cut at a rate of 2:1 by a weight ratio by 20 place / cm<sup>2</sup>, and the nonwoven fabric of 9-mm [ in thickness ] and density 500 g/m<sup>2</sup> was obtained. Next, a 150-micrometer-thick polyethylene sheet is laminated on both sides of this nonwoven fabric, The 600-micrometer-thick glass fiber strengthening polytetrafluoroethylene sheet was laminated on the outside of this polyethylene sheet, this layered product was heated for 3 minutes at 200 \*\*, and it pressurized by letting it pass at 5 cm/second in speed on the roll interval of 1.3 mm, and a 200 \*\* roll. Next, carry out vacuum suction of the glass fiber strengthening polytetrafluoroethylene sheet by 0.5 mm/second in speed from both sides in the 200 \*\* state, and between sheets is made to extend to 8 mm, The interspace cold was carried out after that for 3 minutes, this sheet was exfoliated and the core material for layered products of 88% of voidage with a

thickness of 8 mm which comes to impregnate polyethylene resin between the textiles of a nonwoven fabric was obtained.

[0084] Drawing 1 is a sectional view showing working example of the layered product for shaping according to claim 1. Heat melting of the polyurethane film (melting point of 110 \*\*) which is 30 micrometers in thickness by which 11 is the above-mentioned core material for layered products, and much fine pores with the aperture of 1 mm were provided in this surface is carried out to the skin temperature of 170 \*\* in piles. By pressurizing for 2 minutes by the pressure of 0.3 kg/cm<sup>2</sup>, it comes to form the adhesives layer 12 with breathability.

[0085] The nonwoven fabric 15 which becomes one side of the polyurethane foam 14 from polyester fiber 13, spreading desiccation of the solvent solution which is an air-impermeable skin material which is 3 mm in thickness which is boiled on the other hand, and by which the polyethylene foam 16 of the closed cell was laminated, and dissolved urethane resin in the 16th page of this polyethylene foam is carried out, and the 30-micrometer-thick primer layer 17 is formed. This layered product 1 for shaping carries out heat melting of the 12th page of the adhesives layer of the above-mentioned core material 11 for layered products to 120 \*\*, and is laminated by pressurizing the primer layer 17 of the above-mentioned skin material 13 for 1 minute in piles at this the 12th page of adhesives layer.

[0086] (Working example 2) Drawing 2 is a sectional view showing other working example of the layered product for shaping according to claim 1. 21 was formed in one side of the same core material 11 for layered products as what was used in working example 1. It is an air-impermeable adhesives layer which it comes to laminate by putting a 50-micrometer-thick nylon film (melting point of 100 \*\*) on the 11th page of the core material for layered products, carrying out heat melting to 140 \*\*, and pressurizing for 1 minute by 0.1 kg / cm<sup>2</sup>.

[0087] 23 is a skin material thickness [ which comes to laminate the nonwoven fabric 15 which becomes the whole surface of the polyurethane foam 14 from polyester fiber / 3-mm ] in breathability, and being melting impregnated of the nylon film is carried out as the thermal melting arrival type adhesives layer 22 of this skin material 23 which is alike on the other hand and has breathability, and it is laminated. It comes to laminate this layered product 2 for shaping by piling up the adhesives layer 22 of the above-mentioned core material 11 for layered products, and the skin material 23, where heat melting is carried out, and pressurizing it for 2 minutes at 125 \*\*.

[0088] (Working example 3) Drawing 3 is a sectional view showing working example of the layered product for shaping according to claim 2. On one side of the same core material 11 for layered products as what was used in working example 1, as the heat resistant resin layer 31, a 10-micrometer-thick high-melting point polyamide film (melting point of 200 \*\*), The low melting point polyamide film 32 (melting point of 110 \*\*) is laminated by this the 31st page of heat resistant resin layer. On the other hand, The breathability which comes to laminate the adhesives layer 33 (10 micrometers in thickness) which has the breathability which becomes the 18th page of polyurethane foam of a layered product (3 micrometers in thickness) with the nonwoven fabric 15 which consists of the polyurethane foam 18 and polyester fiber from a low melting point polyamide film (melting point of 110 \*\*). The 33rd page of the adhesives layer of the skin material 34 which it has pastes the above-mentioned low melting point polyamide film 32, and is made with the layered product 3 for shaping.

[0089] (Working example 4) Drawing 4 is a sectional view showing working example of the layered product for shaping according to claim 4. The same heat resistant resin layer 31 as what was used in working example 1, and the thing used for one side of the same core material 11 for layered products in working example 3 is laminated, and it comes to form the air-impermeable adhesives layer 51 with the thermal melting arrival type which becomes this the 31st page of layer from a low melting point polyamide film at 50 micrometers in thickness. 53 is a skin material which consists of polyurethane foam of an open cell and has breathability. It comes to form the adhesives layer 52 which melting lamination of the 50-micrometer-thick low melting point polyamide film is carried out at the whole surface, and has breathability. After preheating of this adhesives layer 52 and the adhesives layer 51 of the 31st page of the above-mentioned heat resistant resin layer is piled up and carried out, by carrying out heat pressing with a 140 \*\* hot calendar roll, melting of the adhesives layers 51 and 52 is carried out, and they are laminated.

[0090] (Working example 5) Drawing 5 is a sectional view showing working example of the layered product for shaping according to claim 6. It comes to form the thermal melting arrival type adhesives layer 12 which has the same breathability as what was used in working example 1, and the thing used for one side of the same core material 11 for layered products by Claim 1. 63 is the skin material with which the nonwoven fabric 15 which becomes one side of the polyurethane foam 14 from polyester fiber was laminated. When



the heat resistant resin layer 61 which becomes the 14th page of polyurethane foam of this skin material 63 from a 10-mm-thick high-melting point polyamide film (melting point of 200 \*\*) extrudes and a lamination laminates, do as air-impermeability. Furthermore, urethane resin is applied to a thickness of 30 micrometers, and it dries to this the 61st page of heat resistant resin layer, and comes to form the primer layer 62. The adhesives layer 12 of the 11th page of the above-mentioned core material for layered products and the primer layer 62 of the 63rd page of a skin material are piled up, heat pressing is carried out with a hot calendar roll from the 63rd page of a skin material, the adhesives layer 12 is fused, and adhesion lamination is carried out.

[0091](Working example 6) Drawing 6 is a sectional view showing working example of the layered product for shaping according to claim 8. The core material 41 for layered products, Spreading desiccation of the solvent solution which dissolved urethane resin in toluene is carried out at the whole surface. The thermoplastic resin film 45 which consists of polyethylene (melting point of 130 \*\*) with a thickness of 160 micrometers which has the primer layer 42 with a thickness of 20 micrometers formed is piled up on the nonwoven fabric 19 which carries out the primer layer 42 outside and consists of glass fibers. After carrying out heat melting of this film resin 45 like working example 1 and impregnating the nonwoven fabric 19, this is extended to a thickness direction and it has 8 mm in thickness, 90% of voidage, and the made breathability. By the above, the polyethylene resin film 45 which has the primer layer 42 on one side leaves the primer layer 42 to the nonwoven fabric surface, it is impregnated, and textiles are mutually joined with the impregnated film resin 45, and the primer layer 42 is formed in the core surface for layered products. [0092]Thermofusion of the thermal melting arrival type adhesives layer 43 formed in the nonwoven fabric face of the same skin material 13 as what was used in working example 1 is carried out, and the layered product 6 for shaping is stuck on the primer layer 42 of the above-mentioned core material 41 for layered products.

[0093](Working example 7) Drawing 7 is a sectional view showing working example of the core material for layered products according to claim 11. The laminated film 70 which the low melting point resin layer 71 which turns into the 72nd page of a high-melting point resin layer which consists of a 20-micrometer-thick high-melting point polyamide film (melting point of 210 \*\*) from 120-micrometer-thick polyethylene (melting point of 130 \*\*) extrudes the core material 8 for layered products, and a lamination comes to laminate. On top of the whole surface of the same nonwoven fabric 10 as what was used in working example 1, the low melting point resin layer 71 side of the above-mentioned laminated film 70 is laid, the hot calendar roll which is 190 \*\* is passed on it, and the low melting point resin layer 71 is impregnated with it to the low melting point resin layer 71 heat melting and by being compressed at the nonwoven fabric 10.

[0094]Drawing 8 is a sectional view showing working example of the core material for layered products according to claim 13. This core material 8 for layered products is obtained by carrying out being melting impregnated of the low melting point resin layer 71 like working example 7 at the nonwoven fabric 10, except that spreading desiccation of the xylene solvent solution of an epoxy resin was carried out and the primer layer 81 was formed in the 72nd page of the high-melting point resin layer of the laminated film 70 used in working example 7.

[0095]Next, a comparative example is shown.

(Comparative example 1) Urethane system hardening type adhesives were sprayed on the core surface for layered products which has the same breathability as what was used in working example 1 by  $350 \text{ g/m}^2$ , and the breathability foam which becomes this from polyurethane foam used for 120 \*\* the layered product for shaping which it heats and comes to paste up.

[0096](Comparative example 2) Laminate the heat resistant resin layer used for the core surface for layered products which has the same breathability as what was used in working example 1 in working example 3, and it is considered as air-impermeability. Urethane system hardening type adhesives were sprayed on this stratification plane by  $350 \text{ g/m}^2$ , and the primer layer of the air-impermeable foam which becomes this from polyethylene foam and has a primer layer on the surface used for 120 \*\* the layered product for shaping which it heats and comes to paste up.

[0097](Comparative example 3) The thermal melting arrival type adhesives layer which has the breathability which it comes to form in the core surface for layered products which has the same breathability as what was used in working example 1. It consisted of a layered product of polyester fiber and polyurethane foam, and the adhesives layer of the skin material which has the breathability which comes to form a thermal melting arrival type adhesives layer in one side used for 120 \*\* the layered product for shaping which it heats and comes to paste up.

[0098][Comparative example 4] Laminate the heat resistant resin layer used for the core surface for layered products which has the same breathability as what was used in working example 1 in working example 3, and it is considered as air-impermeability. The layered product for shaping which the skin material which has the breathability which sprayed urethane system hardening type adhesives on this stratification plane by  $350 \text{ g/m}^2$ , and was used for this adhesive coated surface by the comparative example 3 comes to paste up was used.

[0099][Comparative example 5] The same layered product for shaping as the comparative example 5 was used except having made into  $200 \text{ g/m}^2$  the urethane hardening type adhesive amount sprayed on the core surface for layered products.

[0100]The result of having observed generating of the dirt of the adhesive property of the core material for layered products and a skin material, a moldability, and the core material for layered products is shown in Table 1 about the layered product for shaping of the above working example 1 thru/or working example 6, and the comparative example 1 thru/or the comparative example 6.

[0101]

[Table 1]

|             |   | 通気性 |    | 接着剤所要量 ( $\text{g/m}^2$ ) |      |     | 接着性  | 成形性  | 積層体芯材の汚れ |
|-------------|---|-----|----|---------------------------|------|-----|------|------|----------|
|             |   | 表皮材 | 芯材 | 表皮材側                      | 吹き付け | 芯材側 |      |      |          |
| 実<br>施<br>例 | 1 | 無し  | 有り | 30                        | 無し   | 50  | ○    | ○    | 無し       |
|             | 2 | 有り  | 無し | 30                        | 無し   | 50  | ○    | ○    | 無し       |
|             | 3 | 有り  | 無し | 30                        | 無し   | 30  | ○    | ○    | 無し       |
|             | 4 | 有り  | 無し | 30                        | 無し   | 50  | ○    | ○    | 無し       |
|             | 5 | 無し  | 有り | 30                        | 無し   | 50  | ○    | ○    | 無し       |
|             | 6 | 無し  | 有り | 30                        | 無し   | 20  | ○    | ○    | 無し       |
| 比<br>較<br>例 | 1 | 有り  | 有り | 無し                        | 350  | 無し  | ○    | ○    | 有り       |
|             | 2 | 無し  | 無し | 20                        | 350  | 無し  | ○    | ×(1) | 無し       |
|             | 3 | 有り  | 有り | 30                        | 無し   | 50  | ○    | ○    | 有り       |
|             | 4 | 有り  | 無し | 無し                        | 350  | 無し  | ×(2) | ○    | 無し       |
|             | 5 | 無し  | 有り | 20                        | 200  | 無し  | ×(3) | ○    | 無し       |

(注) 接着性は常温において  $25 \text{ mm}$  幅の成形用積層体を積層体用芯材と表皮材とを  $200 \text{ mm}$  / 分の速度で  $180^\circ$  剝離して評価した。  
成形性は予め成形型により賦形された芯材と表皮材とを予熱し、成形金型内で熱プレスしたものを評価した。  
○ : 異常なし  
×(1) : 成形時に層間剝離によるふくれが発生  
×(2) : 剝離強度  $0.1 \text{ kg/25 mm}$   
×(3) : 接着不均一

[0102]Since each thing of working example 1-6 had the good adhesive property, without the adhesive property of the core material for layered products and a skin material having been excellent, and exfoliating so that clearly from Table 1, the moldability was also good, and it was not further generated at all by the dirt of the core material for layered products. On the other hand, the thing of the comparative examples 1 and 3 has remarkable generating of the dirt of the core material for layered products, and although the thing of the comparative examples 2 and 4 does not have dirt of the core material for layered products, an adhesive amount is dramatically abundant compared with working example. Although the primer layer is provided in the skin material, since there is no thermal melting arrival type adhesives layer in the core material side for layered products, although the thing of the comparative example 5 sprayed urethane system hardening type adhesives, its adhesive strength is uneven.

[0103]

[Effect of the Invention] Since this invention Claims 1, 2, 4 and 6 and the layered product for shaping of 10 and 11 are made with the above composition, the dust which invaded from the fine pores of the skin material and the adhesives layer does not go into the opening of the core material for layered products, and dirt does not produce it in a core material. The process which impregnates a nonwoven fabric with melting resin according to the manufacturing method of the layered product for shaping of Claims 3, 5 and 7, Being able to perform simultaneously the process of forming a heat resistant resin layer in the nonwoven fabric surface, dust does not go into the opening of the core material for layered products by a heat resistant resin layer, and the layered product for shaping obtained by this does not produce dirt. Since the adhesives layer is beforehand formed at least in one side of the core material for layered products, and a skin material, it is unnecessary, and there are few adhesive amounts, and they end, and the adhesives sprinkled to an adhesion side become what has the high reliability of adhesive strength. At the same time a nonwoven fabric is impregnated in thermoplastics according to the manufacturing method of the layered product for shaping according to claim 9, A primer layer thin thickness and uniform can be formed in the surface, the process which applies a primer like before and is dried can be skipped, and the layered product for shaping excellent in the adhesive property can be manufactured efficiently. The process which impregnates a nonwoven fabric with melting resin according to the manufacturing method of the core material for layered products according to claim 12, The process of forming a primer layer in the nonwoven fabric surface can be performed simultaneously, and since the primer layer of thin and uniform thickness is formed in the surface, the core material for layered products according to claim 13 obtained by this is excellent in an adhesive property with a skin material etc. Since the primer layer of thin and uniform thickness is formed in the surface, the core material for layered products according to claim 13 is excellent in an adhesive property, and the layered product for shaping of Claim 8 obtained using this becomes that in which the adhesive property of the core material for layered products and a skin material was dramatically excellent.

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[Translation done.]

その親水性の高さゆえに金属を腐食させる可能性が考えられるので、腐食効果を緩和させるために、pH緩衝効果のあるアルキルリン酸化合物を5～50質量%の割合で混入させても良い。

【0011】本発明における親水化剤の付与方法は、特に限定されることはなく、たとえば繊維製造工程でローラーオリング法、スプレー法、パッド法等で処理しても良いし、あるいはこれらの方法を併用しても良い。

【0012】本発明における親水化剤は水溶液で使われ、繊維に対する付着量(率)は、面分分で0.10～0.50質量%が好ましい。付着量がこの範囲より少ない場合は十分な親水性能が得られないことがある。また繊維製造過程においてカード通過時に静電気が発生して問題が生じることがある。一方、この範囲より多い場合、カード通過時に不織布繊維表面からの油剤脱落が生じ、スラムが発生し機台や不織布内に異物として入る可能性がある。特に好ましくは0.20～0.35質量%付着するように水溶液の濃度、脱落率を設定し、均一に付着させることが望ましい。

【0013】本発明における繊維素材としては、ポリオレフィンの場合は、ポリエチレン、ポリプロピレン及びこれらを主体とした共重合体を挙げることができるが、この中で高密度ポリエチレンが好ましく用いられる。また、複合繊維における芯成分のポリエステルとしては、ポリエチレンテレフタレート、ポリブチレンテレフタレート及びこれらを主体とした共重合体、高融点ポリオレフィンなどを挙げることができる。これらの芯成分の融点は鞘成分に対して20℃以上高いものが使用される。芯成分と鞘成分の融点差が20℃未満であると熱接着時に鞘成分だけでなく、芯成分の溶融が起こり、得られる不織布の風合いが硬いものになる。また、芯成分に少なくとも1つの中空部が存在する場合、上記の芯成分の溶融により中空部の損失が起こり、不織布の嵩高性が阻害されることになる。

【0014】本発明における熱接着性複合繊維の芯/鞘の複合比は、質量比で70/30～30/70とするのが好ましい。延伸性、繊維機械的強度、熱的性能、不織布物性の観点から適当であり、更には質量比で60/40～40/60とするのがより好ましい。芯成分が多くなると熱接着性成分が少なくなって不織布の接着強度が低下し、逆に鞘成分が多くなると機械的強度に問題が生じてくる。

【0015】本発明における熱接着性複合繊維を70%以上使用することにより、ソフトで嵩高であり均一な地合の不織布が得られ、更には不織布製造工程適合性が高いものとなる。また、該不織布を積層使用することができ、ソフトさ、嵩高さ、不織布強度等を調整することができる。

【0016】本発明の衛生材料用繊維は、目付30g/m<sup>2</sup>の不織布とし、実施例の測定方法に記載した方法で

測定した45度傾斜法による人工尿の親水性能が、50mm以下の高親水性を示すことができ、さらに該不織布を密封し、60℃の乾燥機の中に一週間吊り下げておいても該親水性能が、50mm以下を保持することができる耐熱性を有することが特徴である。

【0017】本発明における熱接着性複合繊維を用いて不織布を製造する方法は、公知の方法が採用でき、何ら限定されるものではなく、通常、この熱接着性複合繊維のみあるいは他の繊維と混雑してウェットとし、鞘成分のポリオレフィンの融点以上の温度に昇温し、熱処理装置で熱接着性複合繊維の鞘成分を溶融し、繊維の接触点を点接合させることが行われる。

【0018】

以下、本発明を実施例によって説明する。実施例における測定方法は以下のとおりである。親水性の評価は、以下に示す垂直滴下法と45度傾斜法を採用した。

(a) 垂直滴下法

不織布を100mm×100mmの大きさに切断した試験料を濾紙の上に載せる。常温の人口尿および人口経血を不織布の上方1cmの高さから静かに不織布に均等に10滴滴下させた時の浸透率(%)を測定する。試験料は5枚用意しn=5で測定する。

【0019】(b) 45度傾斜法

不織布を370mm×150mmの大きさに切断した試験料を、45度に傾斜した台状の上に不織布よりやや大きめの濾紙を下敷きにするように載せる。常温の人口尿及び人口経血を不織布上端の上方1cmの高さから静かに滴下させる。滴下して不織布上に落ちた部分が浸透するまでの距離(mm)を測定する。10滴下させ平均を算出する。なお、熱に対する経時変化の評価は、前記(a)及び(b)と同じ不織布を密封し、60℃の乾燥機の中に吊り下げておき、一週間および二週間後に同様に親水性能の評価を行う。

【0020】(c) 不織布嵩(初期嵩、圧縮嵩)

不織布を50mm×50mmの大きさに切断した試験料を同一方向に10枚重ね、3g/m<sup>2</sup>の荷重を掛けたときの厚み(初期嵩)、35g/m<sup>2</sup>の荷重を掛けたときの厚み(圧縮嵩)を測定する。いずれも目付け30g/m<sup>2</sup>で補正する。

(d) 不織布強度(タテ(MD)強度、ヨコ(CD)強度)

不織布をMD、CD方向に25mm×150mmの大きさに切断した試験料をテンシロンにて引張測定を行う(目付け30g/m<sup>2</sup>で補正する)。

【0021】(f) 肌刺激性評価

不織布を50mm×50mmの大きさに切断した試験料について、5人の被験者の腕に24時間貼り付けて、目視で次の3段階の判定をした。

0: 炎症による赤み、荒れは無しほとんど無し。

△：炎症による赤み、荒れがやや有り。

×：かなりひどい炎症あり。

【0022】実施例1、比較例1

融点が130℃のポリエチレンを鞘成分、融点が260℃のポリエチレンテレフタレートを芯成分とし、芯/鞘質量比が40/60の芯鞘複合未延伸繊維を溶融紡糸した。この際、鞘成分を260℃、芯成分を295℃で複合紡糸口金バックに導入し、孔径0.5mmの紡糸孔を1800個有する紡糸口金から、吐出量1442g/分で紡出し、オイルングローラーを経て冷却固化後、1500m/分の速度で引き取り、単繊維繊度5.3dtex、トータル繊度9500dtexの未延伸繊維束を得た。この未延伸繊維束を温度40℃の湯浴で予熱後、温度70℃の湯浴にて2.6倍に延伸した後、120m/分の速度で引き取り、ローラーオイルングにて親水化剤を付与し、スチーム熱処理を実施後、加熱した押し込み

式クリンバーで撚縮を付与した後、シャワーオイルングにて親水化剤を付与し、無緊張状態で温度100℃の熱風で5.4分間処理し、冷却後、切断し、繊度2.6dtex、長さ44mmの熱接着性複合短繊維を得た。この熱接着性複合短繊維100%でカード機を通して不織ウェブとし、熱風循環型の熱処理機にて温度140℃で10秒間熱処理し、目付け30g/m<sup>2</sup>の不織布を作成した。

【0023】上記の実施例及び比較例で付与した油剤組成を表1に示した。なお得られた熱接着性複合短繊維の人工尿及び人工経血に対する親水特性を表2及び表3に、不織布物性、不織布の皮膚刺激を評価した結果を表4に示す。

【0024】

【表1】

| 処方<br>No. | 油剤組成  | 比率(%) | 化粧品原料基準<br>記載有無 |
|-----------|---|-------|-----------------|
| 油剤1       | ラリル <sup>®</sup> ポリマ <sup>®</sup> /酢酸 <sup>®</sup> タリ | 90    | 有               |
|           | PDE ラリル <sup>®</sup> -タリ <sup>®</sup> 酸 Na            | 10    | 有               |
| 油剤2       | ラリル <sup>®</sup> ポリマ <sup>®</sup> /酢酸 <sup>®</sup> タリ | 100   | 有               |
| 油剤3       | PDE ラリル <sup>®</sup> -タリ <sup>®</sup> 酸 Na            | 100   | 有               |
| 油剤4       | PDE ラリル <sup>®</sup> フェート                             | 40    | 無               |
|           | ポリリスチ <sup>®</sup> -タリ <sup>®</sup> 酸 Na              | 5     | 無               |
|           | ラリル <sup>®</sup> フェート K <sup>®</sup> 塩                | 35    | 無               |
|           | PDE ラリル <sup>®</sup> ステル                              | 5     | 無               |
|           | ラリル <sup>®</sup> ステル Na                               | 15    | 無               |

【0025】

【表2】

|      | 油剤<br>処方<br>No. | 油剤<br>付着率<br>(%) | 人工尿、浸透性経日変化(80℃) |     |     |               |     |     |
|------|-----------------|------------------|------------------|-----|-----|---------------|-----|-----|
|      |                 |                  | 垂直滴下法浸透率(%)      |     |     | 45度傾斜法浸透性(mm) |     |     |
|      |                 |                  | 0日               | 7日  | 14日 | 0日            | 7日  | 14日 |
| 実施例1 | 1               | 0.20             | 100              | 100 | 100 | 10            | 15  | 17  |
| 実施例2 | 1               | 0.30             | 100              | 100 | 100 | 9             | 11  | 11  |
| 実施例3 | 1               | 0.40             | 100              | 100 | 100 | 8             | 9   | 10  |
| 実施例4 | 2               | 0.30             | 100              | 100 | 100 | 8             | 9   | 9   |
| 実施例5 | 3               | 0.30             | 100              | 100 | 80  | 35            | 38  | 50  |
| 比較例1 | 4               | 0.30             | 80               | 30  | 15  | 100           | 157 | 250 |

【0026】

【表3】

## PATENT ABSTRACTS OF JAPAN

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(54) FIBER FOR SANITARY MATERIAL AND NONWOVEN FABRIC GIVEN BY USING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide fiber for a sanitary material, having high liquid permeability, scarcely causing problems on spreading of the liquid and remaining thereof, and giving extremely little irritation to the skin, and to provide a nonwoven fabric for the sanitary material.

SOLUTION: This fiber for the sanitary material is furnished with a substance specified in Japanese Standards of Cosmetic Ingredients or a betaine-type ampholytic surfactant as a hydrophilicity-giving agent. The fiber preferably comprises thermally-adhesive bicomponent fiber composed of a sheath component comprising a polyolefin and a core component comprising a polyester or the other polyolefin, wherein the polyester or the other polyolefin has a melting point higher than that of the polyolefin for the core component by 20° C or more. The fiber for the sanitary material preferably has a hydrophilic performance of  $\leq 50$  mm according to a measurement stated in the specification where the nonwoven fabric is tested on a plate inclined at 45° by using an artificial urine after the fiber is formed into the nonwoven fabric having a Metsuke (refer to Japanese Industrial Standard) of 30 g/m<sup>2</sup>. The nonwoven fabric for the sanitary material is given by using the fiber for the sanitary material.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention is textiles used for hygienic goods.

It is related with the nonwoven fabric for hygienic goods using the textiles and it which are excellent in hydrophilic nature in more detail, and are used for hygienic goods, such as a diaper with very few stimuli to the skin, and a napkin, as a nonwoven fabric.

[0002]

[Description of the Prior Art]The nonwoven fabric used to a diaper, a napkin, etc., especially the nonwoven fabric for top sheets, That there is no sense of incongruity to skin since it is a portion which touches skin directly, safe for the skin. It must be equipped through a nonwoven fabric that liquid delivery to a high-polymer absorbent is quick, that there is little breadth in the nonwoven fabric face of a fluid, that the fluid absorbed by the absorber does not relapse into skin through a nonwoven fabric, that the touch is good, etc. The hydrophilic effect of a nonwoven fabric is processing the surface-active agent to the fiber surface by the textiles manufacturing stage. However, the textiles processing agent used for the conventional nonwoven fabric for hygienic goods does not have enough fluid permeability, the liquid remainder and liquid breadth arise on the nonwoven fabric surface, and urine and the sense of incongruity after menstrual blood elimination are made into the problem. There is a fault in which the performance which the character of oils furthermore changes and needs temporally with heat will be lost. In order to touch skin and directly, the skin stimulus of the textiles processing agent poses a problem.

[0003]

[Problem(s) to be Solved by the Invention]The purpose of this invention cancels the problem of this conventional technology, is that fluid permeability loses the liquid breadth and the liquid remainder in a nonwoven fabric face early, reduces urine and the sense of incongruity after menstrual blood elimination, and there is in providing very few textiles for hygienic goods and nonwoven fabrics for hygienic goods of a skin stimulus further.

[0004]

[Means for Solving the Problem]Safety found out oils which have sufficient hydrophilic nature highly, and this invention persons reached this invention, as a result of inquiring wholeheartedly that an aforementioned problem should be solved.

[0005]The following composition is used for this invention in order to solve said SUBJECT.

- (1) Textiles for hygienic goods, wherein a substance given in Standards of Cosmetic Ingredients is given as a hydrophilization agent.
- (2) Textiles for hygienic goods of said one description, wherein hydrophilization agents are betaine type both ionic surfactants.
- (3) Textiles for hygienic goods given in said 1 or 2 to which said textiles are characterized by being a heat adhesive property bicomponent fiber which is polyester or polyolefine with the melting point whose polyolefine and core component are higher than the melting point of said polyolefine not less than 20 \*\* by sheath component.
- (4) Textiles for hygienic goods given in either [ to which hydrophilic performance of artificial urine by the 45-degree gradient method measured by a method which used said textiles for hygienic goods as a nonwoven fabric of eyes 30 g/m<sup>2</sup>, and was indicated in the text is characterized by being 50 mm or less / said ] 1-3.
- (5) A nonwoven fabric for hygienic goods using textiles for hygienic goods given in said 1-4.

[0006]

[Embodiment of the Invention] Hereafter, this invention is explained in detail. Especially if it can use for hygienic goods, it will not be limited, but what is easy to form a nonwoven fabric is preferred, and the textiles in this invention have preferred two-ingredient compound-die textiles of the heat adhesive property in the point which is easy to form a nonwoven fabric.

[0007] The hydrophilization agent in this invention is a substance given in Standards of Cosmetic Ingredients, and are water and a substance with dramatically high compatibility. The standard about the description and quality is determined as Standards of Cosmetic Ingredients about the substance used for the raw material of cosmetics. The substance indicated to this has little influence on skin, and it is suitable for it to the use to a diaper, a napkin, etc. A betaine type amphoteric surface active agent is preferred in these.

[0008] As a betaine compound of both the ionicity in this invention, Lauryldimethyl betaine aminoacetate, a stearyl dimethylamino acetic acid betaine, a 2-alkyl N-carbo \*\*\*\*\*- N-hydroxyethyl imidazolium betaine, a lauric acid aminopropyl betaine, lauryl hydroxy sulfobetaine, etc. are mentioned. In these, lauryldimethyl betaine aminoacetate is preferred.

[0009] In these, lauryldimethyl betaine aminoacetate is preferred in respect of the operability in a textiles manufacturing process. Lauryldimethyl betaine aminoacetate can be used as spinning and an extension primary oil, and finishing oils as the main ingredients of the oils used as the main ingredients.

[0010] Since lauryldimethyl betaine aminoacetate is provided with the feature that compatibility with water is dramatically high, even if it uses it at 100%, there is no problem in particular. However, since a possibility of making the height, therefore metal of the hydrophilic nature corroding can be considered when oils adhere to metal parts, such as a machine stool, moisture evaporates and concentration rises, in order to make a corrosion effect ease, an alkyl-phosphoric-acid compound with pH buffer effect may be made to mix at a rate of 5 - 50 mass %.

[0011] The grant method in particular of the hydrophilization agent in this invention is not limited, may be processed by the roller oiling method, spray method, the pad method, etc. by a textiles manufacturing process, or may use these methods together.

[0012] The hydrophilization agent in this invention is used in solution, and the coating weight (rate) to textiles has preferred 0.10 - 0.50 mass % at solid content. When there is less coating weight than this range, sufficient hydrophilic performance may not be obtained. In a nonwoven fabric manufacturing process, static electricity may occur at the time of card passage, and a problem may arise. On the other hand, when more than this range, the oils omission from a nonwoven fabric fiber surface arise at the time of card passage, and it is generated by SCUM, and may enter as a foreign matter in a machine stool or a nonwoven fabric. It is desirable to set up the concentration of solution and an omission rate 0.20-0.35 mass % adhesion make it desirable especially, and to make it adhere uniformly.

[0013] In the case of polyolefine, as fibrin material in this invention, the copolymer etc. which made polyethylene, polypropylene, and these the subject can be mentioned, but high density polyethylene is preferably used in this. As polyester of the core component in a bicomponent fiber, a copolymer, high-melting point polyolefine, etc. which made the subject polyethylene terephthalate, polybutylene terephthalate, and these can be mentioned. As for the melting point of these core components, a thing high not less than 20 °C is used to a sheath component. The aesthetic property of the nonwoven fabric obtained by melting of not only a sheath component but a core component happening that the melting point difference of a core component and a sheath component is less than 20 °C at the time of heat adhesion will become hard. When at least one centrum exists in a core component, the loss of a centrum will take place by melting of the above-mentioned core component, and the loft of a nonwoven fabric will be checked.

[0014] It is appropriate for the compound ratio of the core/sheath of the heat adhesive property bicomponent fiber in this invention from a viewpoint of spinning nature, ductility, textile machine intensity, thermal performance, and nonwoven fabric physical properties to be referred to as 70 / 30 - 30/70 with a mass ratio, and also it is more preferred to be referred to as 60 / 40 - 40/60 with a mass ratio. If a core component increases, a heat adhesive component will decrease, the adhesion strength of a nonwoven fabric will decline, and if a sheath component increases conversely, a problem will arise in a mechanical strength.

[0015] By using the heat adhesive property bicomponent fiber in this invention not less than 70%, the nonwoven fabric of soft, bulky, and uniform formation is obtained, and also nonwoven fabric manufacturing process conformity will become high. Softness, dimension height, nonwoven fabric strength, etc. can be adjusted by carrying out lamination use of this nonwoven fabric.



[0016]The hydrophilic performance of the artificial urine by the 45-degree gradient method measured by the method which used the textiles for hygienic goods of this invention as the nonwoven fabric of eyes 30 g/m<sup>2</sup>, and was indicated for the measuring method of working example, Even if high hydrophilic nature of 50 mm or less can be shown, this nonwoven fabric is sealed further and it hangs for one week in a 60 \*\* dryer, it is the feature that this hydrophilic performance has the heat resistance which can hold 50 mm or less.

[0017]The method of manufacturing a nonwoven fabric using the heat adhesive property bicomponent fiber in this invention, Can adopt a publicly known method and are not limited at all, and only this heat adhesive property bicomponent fiber mixes with cotton with other textiles, and is usually made into Webb, The sheath component of a heat adhesive property bicomponent fiber is fused with the thermal treatment equipment which carried out temperature up to the temperature more than the melting point of the polyolefine of a sheath component, and carrying out point junction of the point of contact of textiles is performed.

[0018]

[Example]Hereafter, working example explains this invention. The measuring method in working example is as follows. Evaluation of hydrophilic nature adopted the vertical dropping test and 45-degree gradient method which are shown below.

(a) Carry the sample which cut the vertical dropping test nonwoven fabric in size of 100 mm x 100 mm on a filter paper. The penetration rate at the time of making ten drops of the population urine and population menstrual blood of ordinary temperature calmly dropped at a nonwoven fabric uniformly from the height of 1 cm of upper parts of a nonwoven fabric (%) is measured. Five samples are prepared and are measured by n= 5.

[0019](b) Carry so that the slightly larger filter paper on the shape of a stand which inclined the sample which cut the gradient method nonwoven fabric in size of 370 mm x 150 mm 45 degrees at 45 degrees than a nonwoven fabric may be used as an underlay. The population urine and population menstrual blood of ordinary temperature are made calmly dropped from the height of 1 cm of upper parts of a nonwoven fabric upper bed. It is dropped and distance (mm) until it falls and rolls and permeates on a nonwoven fabric is measured. You make it dropped ten times and an average is read. Evaluation of aging to heat seals the same nonwoven fabric as the above (a) and (b), hangs it in a 60 \*\* dryer, is made into one week and Mr. \*\*\*\* after two weeks, and evaluates hydrophilic performance.

[0020](c) \*\*\*\*\* (\*\*\*\*\* , compressed bulk)

Thickness (\*\*\*\*\* ) when the load of a ten-sheet pile and 3 g/m<sup>2</sup> is imposed for the sample which cut the nonwoven fabric in size of 50 mm x 50 mm on a uniform direction, and thickness (compressed bulk) when the load of 35 g/m<sup>2</sup> is imposed are measured. All are amended by superintendent officer 30 g/m<sup>2</sup>.

(d) Nonwoven fabric strength (length (MD) strength, width (CD) strength)

Tensile measurement is performed for the sample which cut the nonwoven fabric in size of 25 mm x 150 mm in MD and a CD direction in tension (it amends by superintendent officer 30 g/m<sup>2</sup>).

[0021](f) About the sample which cut the skin stimulative evaluation nonwoven fabric in size of 50 mm x 50 mm, it stuck on five persons' panelist's arm for 24 hours, and the following three-stage was judged visually.

O : the redness by inflammation and roughness have none of most non-deer.

\*\* : There are redness by inflammation and roughness a little, and it is \*\*.

x : Those quite severe with inflammation.

[0022]Polyethylene terephthalate whose sheath component and melting point are 260 \*\* about polyethylene whose working example 1 and comparative example 1 melting point is 130 \*\* was used as the core component, and the core / sheath mass ratio carried out melt spinning of 40/60 of the sheath-core compound sheep drawn fibers. Under the present circumstances, introduce a sheath component into 260 \*\* and a core component is introduced into a compound spinneret pack at 295 \*\*, It spun by a part for 1442g of discharge quantity/, and took over the speed for 1500-m/ after cooling solidification through the oiling roller, and the non-drawn fiber bunch of single-fiber-fineness 5.3dtx and total fineness 9500dtx was obtained from the spinneret which has 1800 spinning holes with the aperture of 0.5 mm. After extending this non-drawn fiber bunch 2.6 times with a water bath with a temperature of 70 \*\* after preheating with a water bath with a temperature of 40 \*\*, Take over the speed for 120-m/ and a hydrophilization agent is given in roller oiling. After giving crimp by the heated pushing type crimper after carrying out steam heat treatment, the hydrophilization agent was given in shower oiling and it processed for 5.4 minutes by the hot wind with a temperature of 100 \*\* in the state of the atony, and after cooling, it

cut and fineness 2.6dtex and a heat adhesive property composite staple fiber 44 mm in length were obtained. It was considered as nonwoven Webb through the carding machine with 100% of this heat adhesive property composite staple fiber, and heat-treated for 10 seconds at the temperature of 140 °C with the heat setting machine of the hot wind cyclical form, and the nonwoven fabric of superintendent officer 30 g/m<sup>2</sup> was created.

[0023] The oils presentation given by above-mentioned working example and comparative example was shown in Table 1. The result of having evaluated the skin stimulus of nonwoven fabric physical properties and a nonwoven fabric for the hydrophilic characteristic to the artificial urine and artificial menstrual blood of a heat adhesive property composite staple fiber which were obtained to Table 2 and 3 is shown in Table 4.

[0024]

[Table 1]

| 処方<br>No. | 油剤組成   | 比率 (%) | 化粧品原料基準<br>記載有無 |
|-----------|--|--------|-----------------|
| 油剤 1      | ラウリル <sup>®</sup> メチル <sup>®</sup> アミ/酢酸ヘ <sup>®</sup> タイン | 90     | 有               |
|           | PDE ラウリエ-テルリン酸 Na  | 10     | 有               |
| 油剤 2      | ラウリル <sup>®</sup> メチル <sup>®</sup> アミ/酢酸ヘ <sup>®</sup> タイン | 100    | 有               |
| 油剤 3      | PDE ラウリエ-テルリン酸 Na  | 100    | 有               |
| 油剤 4      | PDE ラウリル <sup>®</sup> ステアレート                               | 40     | 無               |
|           | オ <sup>®</sup> リステル <sup>®</sup> エ-メル <sup>®</sup> ックス     | 5      | 無               |
|           | ラウリル <sup>®</sup> ステアレート K 塩                               | 35     | 無               |
|           | PDE ラウリル <sup>®</sup> ステアレート                               | 5      | 無               |
|           | アルキル <sup>®</sup> ステアレート Na                                | 15     | 無               |

[0025]

[Table 2]

|       | 油剤<br>処方<br>No. | 油剤<br>付比率<br>(%) | 人工尿、浸透性経日変化 (60°C) |     |      |                 |     |      |
|-------|-----------------|------------------|--------------------|-----|------|-----------------|-----|------|
|       |                 |                  | 垂直滴下法浸透率 (%)       |     |      | 45 度傾斜法浸透性 (mm) |     |      |
|       |                 |                  | 0 日                | 7 日 | 14 日 | 0 日             | 7 日 | 14 日 |
| 実施例 1 | 1               | 0.20             | 100                | 100 | 100  | 10              | 15  | 17   |
| 実施例 2 | 1               | 0.30             | 100                | 100 | 100  | 9               | 11  | 11   |
| 実施例 3 | 1               | 0.40             | 100                | 100 | 100  | 8               | 9   | 10   |
| 実施例 4 | 2               | 0.30             | 100                | 100 | 100  | 8               | 9   | 9    |
| 実施例 5 | 3               | 0.30             | 100                | 100 | 80   | 35              | 38  | 50   |
| 比較例 1 | 4               | 0.30             | 80                 | 30  | 15   | 100             | 157 | 250  |

[0026]

[Table 3]

|       | 油剤<br>処方<br>No. | 油剤<br>付着率<br>(%) | 人工経血、浸透性経日変化 (60°C) |     |     |               |     |     |
|-------|-----------------|------------------|---------------------|-----|-----|---------------|-----|-----|
|       |                 |                  | 垂直滴下法浸透率(%)         |     |     | 45度傾斜法浸透性(mm) |     |     |
|       |                 |                  | 0日                  | 7日  | 14日 | 0日            | 7日  | 14日 |
| 実施例 1 | 1               | 0.20             | 100                 | 100 | 100 | 15            | 18  | 27  |
| 実施例 2 | 1               | 0.30             | 100                 | 100 | 100 | 14            | 15  | 15  |
| 実施例 3 | 1               | 0.40             | 100                 | 100 | 100 | 14            | 12  | 14  |
| 実施例 4 | 2               | 0.30             | 100                 | 100 | 100 | 10            | 10  | 10  |
| 実施例 5 | 3               | 0.30             | 100                 | 100 | 80  | 38            | 50  | 64  |
| 比較例 1 | 4               | 0.30             | 90                  | 40  | 20  | 90            | 150 | 260 |

[0027]

[Table 4]

|       | 不織布物性       |             |             |             | 肌刺激性<br>評価 |
|-------|-------------|-------------|-------------|-------------|------------|
|       | タテ強力<br>(g) | ヨコ強力<br>(g) | 初期嵩<br>(mm) | 圧縮嵩<br>(mm) |            |
| 実施例 1 | 3009        | 729         | 19.9        | 6.4         | ○          |
| 実施例 2 | 3220        | 679         | 20.5        | 6.6         | ○          |
| 実施例 3 | 3305        | 660         | 20.2        | 5.5         | ○          |
| 実施例 4 | 2890        | 652         | 21.4        | 5.9         | ○          |
| 実施例 5 | 2907        | 668         | 21.0        | 6.0         | ○          |
| 比較例 1 | 3006        | 733         | 20.9        | 5.8         | △          |

[0028]

[Effect of the Invention] According to this invention, there are very few skin stimuli, and safety is high, and a heat adhesive property bicomponent fiber with the high hydrophilic performance and its nonwoven fabric can be manufactured, and these are used suitably for hygienic goods, such as a diaper and a napkin.

[Translation done.]